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EDUCATIONAL MONOGRAPHS

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Visual Education
and
The School Journey

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF PUBLIC INSTRUCTION
HARRISBURG

FOREWORD

The year 1927, which marks the centenary of the death of Johann Heinrich Pestalozzi, is a particularly appropriate time for the Department of Public Instruction to issue this, its first publication on the uses of visual and other sensory materials in the learning process. One of the important contributions of the great Swiss teacher was a practical demonstration of the value of instruction based on observation, experimentation, and reason.

Just as Pestalozzi enriched teaching and facilitated learning through practical methods, so can the teachers of Pennsylvania make their work more effective by bringing pupils into direct contact with objects and phenomena about which they wish to learn, by directing them into situations where they can see, handle, and meditate upon the things with which their study is concerned. Objects, specimens, and models, combined with the school journey, make available a wealth of material that can be used to visualize and vitalize instruction. Graphs, maps, and diagrams facilitate the grasping of situations which are too complex, too extensive, or too subtle for ready comprehension without visual aids.

The material for this monograph was prepared by a committee of representatives from each of the State normal schools and teachers colleges and Dr. C. F. Hoban, the director of visual education. Its purpose is to help the teachers of the State in organizing, conducting, and checking work involving visual aids, particularly the school journey. Since this is probably a pioneer attempt in this country to develop a school journey methodology, the criticisms of teachers and school officials are invited. These will aid the committee in the revision of the lessons for future use.

John A. H. Keith,
Superintendent of Public Instruction

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Pennsylvania. Dept. of Public Instruction

EDUCATIONAL MONOGRAPHS

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CONTENTS

PART I

SENSORY AIDS IN THE LEARNING PROCESS

		Page
1.	Function of Visual and Other Sensory Materials	4
2.	The Development of Visual Education	5
3.	Psychological Aspects of Visual Education	7
4.	Types of Visual Aids	9

PART II

THE SCHOOL JOURNEY

1.	Definition	13
2.	Contribution to the Curriculum	13
3.	Advantages	15
4.	Purposes	16
5.	Organization and Procedure	16
6.	Type Lessons—Art, Civics, Geography, Health, History, Literature, Mathematics, Music, Nature Study and Science, The Museum	18

PART III

APPENDICES

1.	Sources of Free Slides and Films	91
2.	Requirements for Showing Motion Pictures in Schools	93

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VISUAL EDUCATION AND THE SCHOOL JOURNEY

PART I

SENSORY AIDS IN THE LEARNING PROCESS

1. FUNCTION OF VISUAL MATERIALS

Realizing in a new and larger way that sensory experience is the foundation of intellectual activity, educators are today scrutinizing the use of visual and other sensory aids in the learning process. School officials and teachers are seeking information as to the various types of these aids, their sources, and their place in the curriculum. Within the past twenty-five years rapid progress has been made in the development of visual education, and this movement is resulting in the organization of all aids in both classroom and real life that serve to enrich and vitalize instruction.

Visual Education is not a separate subject. It permeates all instruction and is vital to effective learning in every subject of the curriculum. The laboratory method, in itself a visual aid involving various senses, is not new to American schools; it was originally provided that pupils might gain a proper understanding of the sciences through actual observation and experimental demonstration of phenomena, and today laboratory procedure is common in every classroom and in practically every subject.

The present tendency in curriculum-making is to relate the activities of the pupils to life situations. The classroom and the world, then, must be the laboratories in which the children will do their work. Visual and sensory aids—those that can be seen and touched, or that function through a coordination of the senses—are not only eliminating pedagogical faults of the past but are giving a vital touch to present-day instruction and are contributing the elements necessary for the forming of correct initial impressions.

Recent experiments in education show that the effective use of visual and other sensory materials in instruction do three definite things:

(1) Effect an economy of time in learning.
(2) Enrich and vitalize instruction.
(3) Develop correct initial concepts.

The following pupil-teacher dialogue from the September issue of the *High School Teacher* illustrates these three points and shows the need for visual materials in instruction.

Pupil: Teacher, what is a zebra?
Teacher: A zebra is an animal something like a donkey.

Pupil: I never saw a donkey; what is it like?
Teacher: A donkey, dear, is something like a horse.
Pupil: Like old Dobbin?
Teacher: No, no, dear, old Dobbin is a big horse; I mean somewhat like a Shetland pony.
Pupil: A Shetland pony? What is a Shetland pony?
Teacher: Well, it is a very small horse.

The obvious criticisms to the above are: the teacher's interpretation of the word "zebra" was neither ready nor accurate; and did not give the pupil the correct concept. The indefiniteness of the reply created needless uncertainty, digression of thought and confusion in the pupil's mind.

Had pictorial material been included in the classroom equipment, the pupil could have been directed to the file case or pictorial collection where he could have readily secured a correct impression. Following this, the teacher could check the information.

The aim of the Department's service in this field is to bring to the attention of teachers and school officials the values, types, sources, and effective uses of visual materials and the importance of utilizing all the senses in the acquisition of knowledge. The program involves the psychology underlying the use of sensory materials in instruction, an evaluation of the various types of aids, a list of sources of materials, information concerning standard projectors, their installation and operation, and a methodology-technique covering the use of visual and other sensory aids.

2. THE DEVELOPMENT OF VISUAL EDUCATION

A knowledge of the development of visual aids in learning and the extent to which they have been used in the past is necessary to an understanding of their values. Visual instruction is not new to education. It had its beginnings far back in antiquity. The forerunner of the present-day blackboard was the use made of sand in the open-air and village schools of India. The earliest records were picture records. Ancient caves contained drawings and paintings of early animals. The cavemen drew pictures both to warn and inform. Paleolithic man had a picture language of stone. Egyptian hieroglyphics mark the transition from picture writing to early alphabets. Then followed the printing press and later the making of books.

Illustration. The first book which made use of illustration to visualize subject matter was Comenius' *Orbis Pictus* in the seventeenth century. This new departure in textbook writing has been brought to a high state of perfection in modern school books.

Early Exponents of School Journey. In the eighteenth century, Pestalozzi and Rousseau used visual materials to a great extent in their teaching. They preached the doctrine of return to nature—learn life by living it. Out of this practice grew the school journey or field lesson of the present day. The influence of this procedure may be traced in the educational development of our own Commonwealth. William Penn was an exponent of visual education. He was a believer in the value of observation and participation—"learn to do by doing." Benjamin Franklin too was a believer in visual education. Not only was he the first American cartoonist, but he advocated journeys to neighboring plantations that the methods of farmers might be "observed and reasoned upon." This type of instruction was common in the early days.

Object-Specimen-Model. In the middle of the eighteenth century, the British Museum gave a decided impetus to visual education through its valuable collections which the people, teachers and school children were urged to use. Today, museums and museum collections are made available to schools in many states.

Froebel, in the nineteenth century, made the use of sensory materials an outstanding element in his famous kindergarten. He especially stressed instruction through the senses of sight and touch.

The Photograph and Its Variants. In the nineteenth century Niepce and Daguerre made the first permanent photograph, an invention that proved of vital consequence to visual instruction. Out of it have come such distinctive variants as the stereograph, the slide and the motion picture film.

Through this history, from the very earliest period, there are clearly seen a gradual development of visual aids and an increasing realization of their value in teaching.

A Transitional Period. With the rapid development of printing, however, and the increase in the number of subjects in the curriculum, there came an accompanying multiplicity of text-books. The use of illustrative materials—those necessary for correct imaging—requires thorough preparation and careful planning on the part of the teacher. The textbook is always convenient. Too often the line of least resistance has been followed with the result that there was, until the past decade, a lessening in the use of sensory materials in teaching and a correspondingly wider teacher dependence upon textbooks alone for lesson material. The effect of this was very marked. Dependence upon the textbook involves very largely, on the part of the pupil, the acquisition of knowledge by means of the printed page. Printed and oral words are not ideas—they are merely symbols. Before they can mean anything, they must be translated into mental

images. The printed page and the oral description frequently result in inadequate and inaccurate concepts.

Modern psychology has fully justified the attitude of former educators and suggests a wealth of devices to present-day teachers in all courses of study of the curriculum. In the following section is a brief discussion of the psychology underlying the dependence of learning upon sensory experience.

3. PSYCHOLOGICAL ASPECTS OF VISUAL EDUCATION

Any consideration of visual aids and their relation to the learning process serves only to emphasize further their importance in all formal education. Abundant justification of visual education is found in the laws of learning and the strengthening of association bonds, while an analysis of memory and its elements show that retention, recollection, and recognition all depend upon vividness of impression, which is secured most effectively through visual and other sensory aids.

Sensory Experience and Mental Activity. Psychologically, all intellectual activity begins with and depends upon sense perceptions. Sensory experience is basic to all knowledge. Even the higher intellectual processes such as retention, conception, discrimination, and judgment are dependent, either directly or indirectly, upon the fund of experience originally supplied by the senses.

It is patent that the individual secures his experience from the outside world from three sources, namely—(1) direct sensory contact, (2) pictures of objects, relationships, actions, and attributes, and (3) oral, or print or script symbols. Of these three possibilities, the third presupposes sensory experience to which the symbols refer directly, or which will serve indirectly as a basis for interpreting the facts so presented. No word of mouth or printed page can have meaning to an individual except as he has within his experience the necessary sense perceptions which will serve as a basis for interpreting it.

The term "atmospheric pressure" is vastly more meaningful after the student has studied Physics and has watched the lowering of a barometer in a partial vacuum during the varying stages of exhausting the enclosed air. The term "chemical reaction" has only limited meaning to the individual who has never studied Chemistry and has never seen the boiling and heard the sizzling within a test-tube or a retort.

It is a singular fact that while in such abstract studies as Plane and Solid Geometry we have readily accepted visual education as an aid to reasoning for the many who otherwise would find this study impossible, at the same time we have for so long neglected to take

advantage of visual aids in the guidance of learning along other less difficult lines.

Broadening the Sensory Experience of the Child. While training of the child should emphasize the development of discrimination and judgment, it is obvious that sheer enlargement of a child's sensory experience is vital to his education. In this day of books, teachers have had every prompting to resort to pages of printed material as the inexhaustible sources of information, forgetting that in any field of study it is positively dangerous to presume that the child has a sensory background which will enable him to understand, even partially, the words of such pages. One seems reasonably safe in asserting that much of the classroom work in many schools is not only meaningless but confusing, because the tools of the class room are predominantly words which so often are meaningless to the child because of meager sensory experience.

Visual Perception Predominant in Sensory Experience. That we get the greatest percentage of our sensory experience through the visual avenue has been proved by scientific tests. This fact becomes obvious to anyone who analyzes his own world of experience. We learn more rapidly and retain information longer when the learning is based on first-hand sensory contact with materials and processes. Retention, interest, concentration, reflection, association, imagination,—all are stimulated effectively through the use of the proper sensory aid at the appropriate time. Since visualizing is the most prolific source of sensory experience, the impulse to visualize instruction is natural to the average teacher. We unconsciously use graphic, object, and pictorial illustrations to clarify verbal statements, explanations, and discussions. Indeed, an unconscious recognition of sensory experience as basic to all intellectual activity has led to the generous use of similes and metaphors in all description and narration. "Strong as a lion," "swift as a deer," and "white as the driven snow," are ages-old illustrations of our dependence upon sensory experience for the accurate and graphic transference of thought.

Since children learn through physical reactions to environmental stimuli and by mental responses to challenging situations, it follows that learning will be facilitated and instruction be made more effective directly as opportunities for sensory contacts are increased, thus multiplying the experiences that will stimulate self-activity to the highest degree.

Sensory Experience and Instruction Are Reciprocal. Experience makes instruction meaningful and instruction clarifies experience. In a complex world composed of myriads of phenomena and almost countless objects, movements, relationships, and attributes, with innumerable combinations of each of these with the others, a single life-span affords a possibility of experiencing at most only a fractional part of possible sensory life, and relatively speaking only a modicum of possible mental life. The individual begins life with no experience and with the increase of years of living his sensory experience, owing to steadily growing freedom and consequent multiplicity of contacts, increases year after year after the manner of a geometrical progression. His experience and his apperception are likewise reciprocal, in that each addition to his sensory experience enriches his appreciation of subsequent contacts, as well as his subsequent reflection.

Instruction and Sensory Experience Should Parallel Each Other. If all intellectual activity is dependent either directly or indirectly upon sensory experience, it follows that guidance in learning must either parallel or follow experience—it cannot precede. In following the experience of an individual by guidance in learning, the degree of the effectiveness of the instruction varies, other things being equal, indirectly as the length of the period of time intervening.

While genuine instruction must follow experience, the association of sensory experience and instruction by immediate succession, will, all things being equal, produce the maximum rate of learning for any given individual. Any program of instruction should be determined by and should parallel the experience sequence of the individual. Visual aids in learning afford a direct association of object or phenomena with directed observation.

4. TYPES OF VISUAL AIDS

The new interest in the use of visual and other sensory materials as aids in the learning process has resulted in the searching out of all possible types. The following list, arranged alphabetically, is offered for consideration:

- Apparatus
- Blackboard
- Bulletin board
- Cartoon
- Chart
- Cuttings from magazines and newspapers
- Demonstration
- Diagram
- Dramatization
- Drawing
- Exhibit
- Flash card
- Globe
- Graph
- Map
- Model
- Motion picture
- Museum collection
- Pageant
- Photograph
- Postcard
- Poster
- Print
- Sandtable
- School journey
- Sketch
- Slide
- Specimen
- Stereograph
- Tableau
- Textbook illustration

The contribution which each of these aids can make should be carefully weighed by each teacher and school official, and the best appraisal can be made through actual tests in school room practice. This list is simplified when the various items are classified under the following heads:

I. Apparatus and equipment
II. School journey or field lesson
III. Object—specimen—model
IV. Pictorial material
V. Miscellaneous

MAJOR VISUAL AIDS

Apparatus and equipment, the school journey or field lesson, the object-specimen-model, and pictorial material are classed as major visual aids because their use is practically indispensable to effective teaching.

Apparatus and Equipment. By apparatus and equipment are meant such materials as microscope, telescope, projector, blackboard, bulletin board, laboratory equipment, motion picture booth equipment, etc.

Descriptions of laboratory equipment, and this applies to all subjects, are contained in catalogues of various supply firms.

Projectors come under apparatus and equipment. A standard still projector is as necessary to the modern school as any other piece of equipment. A good stereoptican can be purchased for $60.00. This will make available to any school district a wealth of slide material that can be used to enrich every subject in the curriculm.

Projectors, installed for school purposes, should meet certain definite standards. If high standard machines are to be acquired and the purchase of inferior projectors is to be avoided, a knowledge of these standards is necessary. The Department, with the assistance of the State Visual Education Committee, has conducted a study of projectors, tested by scientific methods and successful service. This study is now a continuous process. Results are revised as new machines are approved. School officials and teachers are invited to avail themselves of the benefit of this study. It will serve as a guide in the selection of machines best suited to meet the particular needs of school districts.

Another service that is proving of value to school districts which have projectors but no material, is a source sheet of free materials. This sheet gives the sources of 100,000 slides and 250 films that may be had for transportation charges. (See Appendix 1.)

Many inquiries come to the Department for information concerning the showing of motion pictures in the schools. In appendix 2 is printed a statement of the requirements as set up by the Department of Labor and Industry for booth construction and the operation of motion picture projectors.

The School Journey is classed as a major visual aid because of the richness of its contribution. Part II of this bulletin is devoted to a comprehensive treatment of this type.

The Object-Specimen-Model type is a highly valuable one. The object is the thing itself—plant, fruit, vegetable, bird, animal, etc.—that can be brought into the classroom for study. The specimen is a sample, a part intended to show quality, one of several things which represent all—for example, a piece of coal, wood, cloth, etc. The model is a small-size representation, as for example a building, engine, heart, lungs, globe, etc.

The best place to begin the study of cotton would be at a cotton plantation. But Pennsylvania's children cannot go to a cotton field. The cotton plant, however, with its flower and fruitage can be brought to the school room where the children, in addition to seeing its arrangement in the boll, can handle the cotton, feel the fibres, pick out the seeds, go through the process of combing it and twisting it into strands. This exercise, supplemented with photographic material—showing the cotton field, method of planting, stages of growth and cultivation, and the processes through which the cotton passes from the boll to the manufactured garment—will enable the child to understand the relationship between cotton as a plant and as an article of clothing.

Pages are required to set forth the principles of an engine or motor. The minature model, amplified with pictorial material, gives a correct representation of the thing and enables the pupils to see the relationship of its various parts. We too often take a considerable period of time to describe verbally or through the printed page a relationship which could be portrayed more accurately and vividly in half or a quarter of the time by means of the natural setting, environment, situation, object, specimen, model or picture. Only actual tests of the use of these aids are needed to convince the teachers of their value.

Pictorial Material shows images of objects of study. Pictures appeal to the eye. They are in themselves a language, the oldest as well as the most universal tongue in the world. They tell a story more graphically and tersely than words. Business enterprises rely on this principle to attract customers. The cartoonist often delivers his message more concisely than the gifted writer. Newspapers and

magazines today use photographic material generously because it presents to the reader true images. The prime value of pictorial material in the school room is that it portrays images of things with which students may not come into actual contact. In other words, pictures bring the world to the child.

PART II

THE SCHOOL JOURNEY

1. DEFINITION

The school journey is a school exercise designed to provide complete sensory experience relative to such phenomena as cannot be brought into the school room. It involves the conducting of pupils to places where the subject matter of instruction—objects, scenes, situations, relationships, etc.—may be studied to the best advantage.

2. CONTRIBUTION TO THE CURRICULUM

The traditional notion of education—associating the four walls of the school room, the book and the desk to too great an extent with the act of learning—has been supplanted with the larger thought that children should learn from the world at large, that the outside world as well as the classroom shall be the laboratory in which children will do their work. It is necessary for the child to know the world in which he lives. He should be introduced to it early and encouraged to master its mysteries. The school journey supplies the avenue.

Art. Art instruction should not be confined to the classroom alone. The objectives of art can be the more readily realized through visits to churches, galleries, scenic spots, specimens of landscaping and beautiful architecture, model buildings and homes, artistic windows where clothing, home furnishings, etc., are displayed.

Geography. Can a valley be as effectively taught from the printed page as from an eminence where pupils can view a real valley and come into direct touch with life situations as they function there? The words of the textbook describe building stones, minerals, etc., but a visit to a quarry and mine, or specimens of marble, granite, limestone, iron, lead, zinc and other ores, which the pupils may handle—supplemented with pictures of the processes by which they are made into shelter materials or useful commodities—all serve to make instruction concrete and contribute the vital element.

Literature. Literature will be enriched and the desire to read stimulated through literary rambles. Visits to homes of authors, to their resting places, and to spots that inspired their writings, will give added interest. The literature of nature—the tree, the flower, the scene, the thing described—should be read in the presence of nature. The appreciation of nature poetry is greatly enchanced by

the recollection of pleasurable hours in the out-of-doors, with wild flowers and trees, with streams and hillsides. Book shops and libraries, where manuscripts and rare books may be seen, are also helpful avenues.

Music. Music, like literature, deals much with nature—birds, flowers, trees, mountains and streams. A visit to these and to the home and workshop of the composer give the student an understanding of the setting of musical productions. Attendance at musical renditions—where the leader communicates his feelings and ideals to his orchestra, and the members in turn give expression to them through their instruments; or where an artist interprets a vocal or an instrumental composition—enables one to appreciate, through the combination of eye and ear, the beauties and meanings of music.

Mathematics. Mathematics will be vitalized through outdoor lessons that involve practical measurements; and through motivated, concrete problems rather than abstract computations. Arithmetic, geometry, trigonometry and surveying offer rare opportunities for field work.

Nature Study and Science. The school journey is indispensable to effective work in Nature Study and Science. These subjects need visits to museums, zoological parks, botanical gardens, examples of structural engineering, chemical and other manufacturing plants, telephone buildings electrical works, radio stations, and aeroplane fields. Bird, botanical and astronomical rambles develop nature lovers.

Vocational Education. The school journey offers a rich field for Vocational Education. Commercial subjects will be made practical through visits to office buildings, public enterprises, transportation departments, institutions, industries, etc.—places where commercial activities may be seen and studied firsthand. Industrial and agricultural classes will profit by visits to mining enterprises, farms, manufacturing plants—places where the mechanic, the artisan, the operator, and the expert may be seen at work.

Correlation. The school journey offers unusual opportunities for correlating the various subjects. While conducting field lessons, safety-first may function in a practical way. The humane treatment of birds and animals can be encouraged; trees, studied and sketched; the necessity for reforestration, emphasized; examples of architecture, attractive landscaping, clean streets and objects of special interest, pointed out. Attention can also be directed to the improved highways, recreational provisions, the distribution of the natural resources of our Commonwealth and the commendable projects it has under way.

Socialization. The consensus of opinion among educators is that the new or revised curriculum should be more social. There is a pronounced feeling that the school has been too remote an institution; that there should be a closer blend between school life and the outside world. The tendency today is to organize school activities around life situations. The school journey is a valuable medium in this scheme.

Teachers should list all possible school journey avenues and make use of them. Through these avenues the spark of scientific genius may be kindled; the naturalist, developed; the musician, started; artistic genius, stirred; literary ambitions, set on fire; patriotic impulses, quickened; and the spirit of adventure, aroused. The school journey offers opportunity to set to work the principle of self-activity. It will help children to search, to accomplish, to satisfy; it will enable them to form wholesome habits, and teach them how to spend their leisure time in a profitable way.

3. ADVANTAGES OF THE SCHOOL JOURNEY

A strong recommendation for school journey practice is the fact that it is a cooperative enterprise. Teacher and children join in the project. The child is the active agent; the teacher, the wise counselor and skillful guide. Through the teacher's generalship, initiative can be stimulated, powers of self-dependence cultivated, and this type of instructional aid made an effective tool in achieving the objectives for which school work is intended.

Among the advantages of the school journey are the following:

1. It shows natural phenomena in their proper settings.
2. It tends to blend school life with the outside world, putting children in direct touch, under learning situations, with things, persons, movements, relationships, environments, occupations, tendencies, trends, functionings.
3. It stimulates interest in natural as well as man-made things and situations, and enables students to know intimately their environment.
4. It involves the consideration and solution of problems arising from individual and group participations in natural social situations.
5. It affords opportunities to develop keenness and accuracy of observation and to experience the joy of discovery.
6. It sets up "a challenge" to solve, and thus stimulates constructive, creative thinking.
7. It helps children to organize their knowledge.
8. It develops initiative and self-activity, making pupils active agents rather than passive recipients.

9. It provides helpful practices, and thereby cultivates the habit of spending leisure time profitably.
10. It serves to arouse ambitions and determine aims.
11. It provides for valuable correlation of subjects.
12. It effects a genuine socialization of school procedure.

4. PURPOSES

Among the definite purposes for which school journeys or field trips may be conducted are:

1. To serve as a pre-view of a lesson and for gathering instructional materials.
2. To create teaching situations for cultivating observation, keenness, discovery—to encourage children to see and know the things about them.
3. To serve as a means of arousing specific interests—as in birds, trees, art productions, historical settings.
4. To supplement classroom instruction; to secure definite information for a specific lesson—as in arithmetic, civics, geography, literature.
5. To verify previous information, class discussions and conclusions, or individual experiments.

5. ORGNIZATION AND PROCEDURE

Preliminary Survey. In planning school journey or field lesson procedure, a first essential is to make a survey of the immediate and neighboring surroundings in order to list all available materials; to familiarize teachers with their location and avenues of approach, as well as special features and the purposes they will serve.

This will require several exploratory expeditions. Teachers find survey work wonderfully stimulating. New material is a matter of constant discovery. When a survey is made by a supervisory official and the teaching corps, it becomes an ideal teacher project. The staff is divided into groups. Each group selects its leader and becomes responsible for a certain area. Reports are made by these groups at teachers' meetings and the composite report furnishes the necessary data for the entire school district.

The number of journeys will depend upon the importance of materials and their relationship to the curriculum. Lessons on or near the school plant can be conducted in the regular recitation period; those within easy access of the school, after school, or the last period of the morning or afternoon; if at some distance, on a Saturday morning or holiday. Some journeys require an entire day. Proper arrangements should be made with the school authori-

ties. For trips to museums, public buildings, industries, it will be necessary to make arrangements for guides, vehicles, etc.

School Journey Technique. The school journey, though highly valuable and a major visual aid, is but too rarely used. The reason is, perhaps, that teachers do not know school journey technique. They too often fail to see the material which is close at hand; and possibly have not, in their teacher preparation, learned how to use it in instruction.

The following technique is recommended for organizing and conducting a school journey:

First Step—Evaluate the advantages in order that as many as possible may be profitably utilized.

Second Step—Determine the purpose for which the journey is to be conducted; or a possible combination of purposes.

Third Step—Examine survey data for

1. Materials that will develop correct concepts.
2. Situations around which activities may be organized that will assist pupils in developing desirable attitudes, skills and habits.

Fourth Step—Make necessary arrangements with

1. School authorities.
2. Owners or representatives of places to be visited.

Fifth Step—Initiating the journey

1. Develop the need—during class discussion, or group activity, etc.
2. Have pupils fix definitely the aims.
3. Teacher preparation—familiarity with place, route, features, necessary reference material.
4. Pupil preparation
   a. Equipment—notebook, field glasses, proper clothing, etc.
   b. Study of reference material.
   c. Spirit of alertness; determination to meet and solve situations.

Sixth Step—Instruction en route and the lesson

1. On the way—pupils alert, at times noting and listing things seen; teacher a constant guide.

2. At the place—the definite lesson; pupils utilizing initiative, self-activity, observation, teacher guiding the organization of pupil observations.

3. The return—pupils exchanging ideas, freely discussing experiences, asking questions, etc.

4. The follow-up

   a. Reports from pupils.
   b. Discussion of reports; questions by pupils and teacher; evaluating reports.

   c. Coordinating the work.

Seventh Step—Appraise the lesson

1. Teaching values

   a. Enriching and vitalizing.
   b. Motivating.
   c. Socializing.

2. Constructive influence on pupils' attitudes, habits, skills.

6. TYPE LESSONS

There seems to be a unamimity of opinion regarding the pressing need of a procedure in the use of visual aids. Accordingly, as a beginning of a school journey methodology-technique, the Pennsylvania Visual Education Committee has submitted the type lessons which follow.

They are inserted practically as presented, so that teachers may adapt them as necessity requires and their judgment dictates. Preceding each lesson, or group of lessons, is a composite summary of the surveys made in the normal school and teachers college centers which indicates available material for the different subjects of the curricula. This summary in each case is intended to be merely suggestive.

TYPE LESSONS

	Page
Art	21
Civics	29
Geography	37
Health	45
History	48
Literature	53
Mathematics	58
Music	62
Nature Study and Science	66
The Museum	87

ART

Architecture

Homes, churches, public buildings, bridges, institutions, etc.

Landscapes and Scenery

Towers, eminences, highways, parks, gardens, private estates, valleys, farms, etc.

Costumes and Clothing

On streets; in shops, fashion shows, exhibitions, manufacturing plants.

Furniture and Furnishings

Homes, museums, public buildings, shop windows, manufacturing plants, art stores, galleries, antique shops.

Paintings and Sculpture

Picture galleries, art shops, homes, churches, public buildings, Mausoleums.

ART

1. HAND LOOM WEAVING

Possible Interest Approaches Through Art

1. Industrial Arts, Textiles, Tapestries
2. Decorative Design—all-over pattern or repeat
3. Interior Decoration and Costume Design—rugs and fabrics, hangings and drapes

Correlations

1. History—Homespun, development of weaving machinery and processes, history of clothing and fabrics
2. Geography—What becomes of cotton and wool, the textile industry, imports and exports, water power in New England, home industries and activities
3. Vocational—The textile industry, the operation of the loom, conservation of raw materials and reclamation projects

Preliminary Arrangements

1. Cooperation and permission of superintendent and principal
2. Ability and willingness of loom operator to demonstrate for the group
3. Number to be accommodated, processes that need to be explained
4. A thorough understanding of the processes by the teacher conducting the party
5. Transportation provisions

Preparatory Work with the Children

After the foregoing preliminary arrangements have been made, the interest of the children is stimulated through one of the preceding avenues of approach. For the sake of clarity, we will take a specific approach, that of Decorative Design—the surface pattern.

The uses of the surface pattern by industry should be discussed and the textile industry singled out for further study. By questioning the fact that there is in the neighborhood some one who is using a hand loom might be brought out. For our problem, a woman who weaves rugs from rags will be taken.

Research

Simple readings on textiles and the weaving process in general are given, followed by class discussions of history and process. The words "warp," "woof" or "weft," "heddle," etc., should be learned in this connection.

Art Problem

Decorative Design and Color. After a sufficient understanding of the weaving process is developed, the children should be given the problem on a large scale with colored crayon or stick printing outfits on squared paper. This being done with the intention of use in the weaving to follow. Color schemes are discussed and proper materials for weaving chosen.

Industrial Arts Problem

Weaving and Structural Design. A single loom of cardboard, slotted at the ends for the warp, should be made and threaded. A few rows of plain weaving should be attempted not only as a border but also to give the necessary practice or review before the intricate weaving of pattern is attempted.

The School Journey

At this point it was decided to make the visit. The children walked about a mile to the home of an elderly lady, Mrs. Tilton, the weaver of beautiful rugs on the hand loom.

When we arrived, Mrs. Tilton ushered us into her workroom. After looking around a few minutes, she operated the loom, weaving a few rows. She used two different colors of rags, which made a simple pattern. She then stopped working; and following a simple outline, suggested by the teacher beforehand, explained in a general way the complex process of threading the loom, showing how different effects may be obtained by variations of color in the warp. She showed examples of various weaves. Samples of rags and warp also were shown.

The process of using the heddle and working the shuttle were demonstrated, and then more weaving was done. Particular emphasis was here placed on the method used in obtaining a regular, orderly pattern of color. The children were allowed to ask questions and an attempt was made to answer them as fully as possible. When their inquisitiveness was satisfied, the children returned to the school for dimissal.

The trip was followed by class discussion and comparison of different methods—those used by Mrs. Tilton and those in the problem they themselves were working out. The problem was completed, and a booklet on weaving was written and illustrated.

ART

II. A PROJECT WITH AN ART AND CIVICS INTEREST

Introduction

The class had been working for several weeks on an art project which had for its aim the compiling of data on Pennsylvania's contribution to American art. A composite of the reports made in class showed the following:

1. Pennsylvania Firsts

   Pennsylvania Academy of Fine Arts is the oldest art school in America.

   The Pennsylvania School of Industrial Arts and the Philadelphia School of Design for Women are the oldest of their kind in this country.

   Pittsburgh was the first American city to have an art exhibit of International scope.

   Pennsylvania leads the country in textile and other art industries.

2. Distinguished painters of Pennsylvania

   Edwin A. Abbey, John W. Alexander, Cecilia Beaux, Henry S. Bisbing, Hugh Breckenridge, Mary Cassat, Thomas Eakins, Daniel Garber, Birge Harrison, T. Alexander Harrison, Johanna Hailmann, John McClure Hamilton, Daniel R. Knight, W. L. Lathrope, George B. Luks, Violet Oakley, Wm. T. Richards, P. F. Rothermel, Mary Rogers, Edward W. Redfield, W. Elmer Scholfield, Henry O. Tanner, A. Bryan Wall, J. S. Sargent, Thomas Hovenden, The Morans (Thomas, Edward, Peter), Thomas Sully.

3. Distinguished illustrators of Pennsylvania

   Joseph Pennell, Stephen Parrish, Maxfield Parrish, Charlotte Harding, George Harding, A. B. Frost, Charles S. Rhinehart, Elizabeth Shippen Green, Alice Barber Stephens, Jessie Wilcox Smith.

4. Distinguished sculptors of Pennsylvania

   William Rush, Charles Grafley, Sterling Calder, George Gray Barnard, Blanche Nevin, Albert Laessle, R. Tait McKenzie, Samuel Murray, Howard Roberts, Wm. T. Trego.

5. Distinguished craftsmen of Pennsylvania

Nicola D'Ascenzo	Stained Glass
William Willet	Stained Glass
Morgan Colt	Wrought Iron
Jessie Gordon	Pottery
W. R. Mercer	Garden Pottery
Geo. W. Sotter	Stained Glass
Samuel Yellin	Wrought Iron
E. F. Curtis	Pottery
H. C. Mercer	Tiling
Henry W. VonStiegel	Glass
John Barber	Woodcarving

Initiating and making the journey

During the discussion of the reports, students expressed a desire to see some art productions of these Pennsylvanians.

Student—I have seen the murals of Edwin Austin Abbey, Violet Oakley, and W. B. Van Ingen; the sculpture of George Gray Barnard; and the tiling of H. B. Mercer, in the State Capitol at Harrisburg. I should like to see the work of some other Pennsylvanians.

Another Student—When I saw the six murals, "The Evolution of the Book" by John W. Alexander in the Congressional Library at Washington, I was quite proud of Pennsylvania.

Other Students—Why not go to Philadelphai to see how many Pennsylvanians are represented in the art galleries there? Let us go some Saturday.

Teacher—It will be best to visit but one gallery on our first trip. Which one shall it be?

Student—The Academy of Fine Arts is the oldest in the United States, let us go there.

Committees of students made arrangements for the trip and guides at the Academy. In the meantime, Who's Who in Art, The Academy catalogs, and other art literature, were studied for information concerning Pennsylvania Artists.

At the Academy

The class was divided into six groups to make a study of the r spective sections of the gallery. Group one was assigned to rooms A. K, I, the north and south corridors; group two, to room B; group

three, to rooms G. and H; group four, to north and south transepts, rotunda, east and west corridors; group five, to room F; group six, to rooms E, C, and D.

At the end of one hour, the groups assembled and reported their findings. Then a trip was made through the gallery, the students viewing every specimen of art by a Pennsylvanian. The first stop was made in front of the three large paintings by Benjamin West: Christ Rejected, Paul and Barnabus Preaching, and Death on the Pale Horse.

Teacher—How would you characterize these West paintings?
Student—They are of the religious type.

Next, Henry S. Bisbing's "In the Meadow" was viewed.

Then the sculpture specimens were studied, the following being noted:

Chanticleer	Albert Laessle
Portrait Bust	Charles Grafley
The Man Cub	A. Sterling Calder
George Washington	Wm. Rush
Narcissus	Beatrice Fenton

One entire room was devoted to portraits and on these the following names of Pennsylvania painters were found:

Thomas Sully	John Neagle
Jane Cooper Darley	Bass Otis
Thomas Eakins	Alice Kent Stoddart
Charles Wilson Peale	Gilbert Stuart
James Peale	John S. Sargent
Rembrant Peale	John McClure Hamilton
John Lambert	Thomas P. Anshutz
Jacob Eicholtz	Martha Walter
James R. Lambdin	Violet Oakley

Much interest was manifested in Wm. T. Richards' "Old Ocean's Gray and Melancholy Waste".

Teacher—What type of painting is this?
A Student—A marine scene.
Teacher—Do you note any other marine scenes?
Student—Yes, "Mr. Richards' Bell Buoy at Newport."
A second student—"The Wave" by Alexander Harrison.
A third student—"A glimpse of the St. Lawrence" by Birge Harrison.

"The Village Stream" by Hugh H. Breckenridge aroused much interest.
Teacher—What is an outstanding quality in this picture?
A student—Its exquisite coloring.

Other pictures viewed were:

Venice	Thomas Moran
Hailing the Ferry	Daniel Ridgway Knight
New Hope	E. W. Redfield
The Old Elm	E. W. Redfield
The Twin Birches	Willard L. Metcalf
The Falcon	Thomas Hovenden
The Pennsy Train Shed	Morris Hall Pancoast
Tragic Muse	Violet Oakley
The Lacquer Screen	Leopold Seyffert
The Tanagra	Thomas P. Anshutz
Still Life With Fruit	Mary Mason
A New England Woman	Cecilia Beaux
The Quarry	Daniel Garber
A Quiet Hour	Jno. W. Alexander
The Cello Player	Thomas Eakins

"I love these winter scenes" said a student stopping in front of W. Elmer Schofield's "Winter." "The street scenes appeal to me," said another student, pointing to Nancy Ferguson's "On a Saturday Afternoon".

Teacher—Why do you like the snow scene?
Student—Because it is peaceful. The Purity of the snow appeals to me.
Teacher—Has any one noted any other winter scenes?
A student—Yes, "A Winter Morning" by Chas. M. Young.
Another student—"Addingham Winter" by Fred Wagner.
Teacher—And why do you like the street scene?
A student—Because it shows life, activity and color.
Teacher—Does anyone note another street scene?
A student—"Lower Broadway in War Time" by Colin Campbell Cooper.
Another student—Would this not be called an historic picture?
Teacher—Do you think it could be called both?
Teacher—Have you noted any historic pictures?
Student—"The Battle of Lake Erie" by Thos. Birch.
Another student—"The State House on Day of the Battle of Germantown", by Peter F. Rothermel.
Teacher—Have you enjoyed the visit?

Students—Immensely. When may we see the other art galleries and the specimens of art in the city

Teacher—We shall plan for that later.

Back in class

Aim—to help the student understand and enjoy several of the pictures.

Teacher—What pictures did you like best of those we saw?
Student one—"Winter" by Schofield.
Student two—"Lower Broadway" by Cooper.
Student three—"Still Life" by William Chase.

The teacher, by bringing out the following facts through thoughtful questioning, tried to show:

1. Charm of color—harmony of color.
2. Material—landscape, people, or objects made beautiful by the artist's arrangement.
3. Line—Value—Composition.
4. Suggestions of the artist that stir the imagination.
5. Responsive feelings inspired.

(For the lower grades 1, 4, 5 are sufficient points to talk about.)

CIVICS

State buildings and offices, work going on within; county buildings and offices, work going on within; municipal buildings and offices, work going on within; outside projects and activities; water system; markets—wholesale and retail, public works, hospitals and other welfare institutions; means of communication and transportation; provisions for protecting life and property; education, health, recreational facilities; community planning; how laws are made, interpreted, enforced; election procedure; how people live and make a living.

CIVICS

I. COMMUNITY CIVICS JOURNEY

Problem:

To discover how the State aids, directs, or regulates the activities of people engaged in certain specific occupations.

Aims: Immediate—that

1. Pupils may investigate actual conditions obtaining in various occupations.
2. They may perceive the relationship of the State to the needful occupations of people in their own community.
3. They may see the benefits to the public which accrue from State supervision.
4. They may learn to present requests to and gain information from busy people in a courteous and businesslike way.

Ultimate—that

1. The value of the occupations studied may become apparent to the pupils.
2. Their loyalty and respect for the State may increase as they see it functioning for their protection.
3. Their experiences and vocabularies may be enlarged through the use of terms appropriate to the various occupations.
4. They may develop powers of accurate observation of facts needed in a social survey.

Materials and other requirements

1. Folders, notebooks, pencils, pens, paper.
2. The buildings and offices devoted to certain occupations.
3. The cooperative aid of people engaged in the various occupations, and of the school officials in permitting the class to visit these places.
4. Preliminary lists of questions appropriate to the investigation of the problems under consideration—these to be formulated by the pupils.
5. The pupils' own alert, spontaneous questioning about matters under investigation.

Approach

Teacher — Recently we all enjoyed making posters showing how the State is connected with our lives. There was one thing I noticed, however. Most grown people seemed to be engaged in work for a large portion of the time. I thought we might learn more than we know about how the State helps **them.**

Pupil — Suppose they were bootleggers. I don't believe the State would help them much. Probably helping them to a jail sentence would be about as far as it would go.

Teacher — In that event the State might be more interested in helping other people, William. But I believe bootleggers are exceptional members of society, anyway. It would be more valuable to think of the kind of occupations in which your fathers and mothers engage, would it not?

Pupil — Oh boy! I have it! Dad will tell us how the State helps him run his bakery, if I ask him to.

Second pupil — Let's all go down to the bakery. We could learn more about that from the baker than from a book.

Third pupil — Listen, folks! Vivian's father can tell us how the State helps him to concoct his pills. Lloyd's father superintends the railroad, too. We could learn ever so much about State aid from him.

Teacher — I wonder if Edna's father could not tell us in what way the State helps him to guide the conduct of a merchant's business.

Pupil — Grace's father helps the doctor. We ought to include him and find out how the State is related to the drug store.

Second pupil — My goodness! People don't have to be your fathers to tell you things. Any company in town will be glad to do it. I move we go to the bakery and to the Clarion Water Works. These certainly are necessary for everyone in town. And we shall learn to what extent the State inspects both.

Teacher — Do I hear a second? Motion is seconded.

The motion was voted upon and carried. Preliminary arrangements were discussed. A committee was appointed to ask the Water Company for permission to visit its plant. The merchant, the druggist, the doctor, the baker, and the railway superintendent were approached through **their children.**

Through this planning the class discovered the need of the co-operation of the following people in carrying out their project:

1. School officials.
2. The various people and establishments to be visited.
3. Employees of these establishments.

The class made all necessary arrangements before entering upon their investigations. They divided their work as follows:

1. Two trips were to be made during school hours by permission of the school authorities, since school hours coincided with possible visiting hours in these cases. These were the trips to the bakery and the Clarion Water Supply Company.

2. Two trips were arranged for the night following the introductory lesson. These were the trips to the railroad superintendent and to the doctor.

3. The two concluding trips were made during the evening, two days afterwards. This gave the class time to arrange reports from the various trips and to prepare further questions about these trips. These final trips comprised visits to a drug store and to a merchant.

4. Before the time of each visit a list of questions was formulated by the members of the class concerning the State's aid, direction, or restriction of the occupation to be investigated.

5. At the conclusion of the study a report was made of the work covered by this study to another Community Civics class. Copies of the reports of each investigation became a part of the school's sources of information concerning local conditions. Tentative plans were made for reports in Assembly, if what was done was good enough. Individuals were chosen as secretaries of each investigation. All members of the class agreed to take notes, and to hand these notes to the secretary for compilation into his report. This was done so that the report might include all points covered by the class.

6. The following list of questions for the visit to the bakery was compiled by the class.

a. Does the State inspect your premises?
b. Do you have to have a license?
c. What State regulation of your employment of help exists?

d. Does the State have regulations about packing and preparing your products for market?
e. What safety devices does the State require from you?
f. Do you have to be insured?
g. Is there a standard price for what you sell?
h. Do you have to have standard weights and measures?
i. What laws are there about adulteration of food products?
j. Are there any regulations about shipping bakery stuffs?
k. Do you get any information about better methods in the bakery through pamphlets issued by the State?
l. How are you protected by the State against impurities in raw materials?

The next meeting of the class occurred at the bakery shop. Here the class members asked the questions they had prepared as they noticed the following features of the shop:

1. Glass-enclosed cases.
2. Each loaf of bread cased with oiled paper.
3. Large racks and hand trucks fitted with shelves for holding freshly baked loaves.
4. Variety of goods produced.
5. Wrapper used in putting oiled paper around bread.
6. Large containers for shipment of bread.
7. Mixer for bread dough.
8. Cake filling mixer.
9. Ovens.
10. Furnace.
11. Boiler.
12. Elevator (Freight).
13. Ventilating system.
14. Lighting system.
15. Large plate glass front for admission of light.
16. Baker's license.

The shop as seen by the pupils themselves is best shown through the secretary's report. This includes an account of the trip, a copy of the baker's license, and a floor plan of the bake shop, with an accompanying explanation of the location in the shop of points in which State cooperation was evident. The three parts are included in the secretary's report, which follows:

The Relationship Between a Bakery and the State

(Secretary's Report)

Just after organizing our project, May 23, we started for the bakery to find out its relationship to the State.

The first question asked was about State inspection. We learned that all bakers must go before a doctor every six months to see if they have any disease. Then we learned that all machinery is inspected once a year for the safety of the employees.

We then inquired about the elevator. We were told that the elevators must be inclosed by wire, if freight; but if passenger, they must be boxed. They also must be enclosed overhead, in case of falling objects.

We then learned how a bakery is begun. Before starting in the baking business a man must submit a blueprint of his plans to the Department of Labor and Industry at Harrisburg. The Department then sends back a permit. Each baker must have a license, which is given him free of charge if the ventilation and light are good.

We then were told of the regulations of the employees. All working hours must be posted. The employees are not permitted to work more than ten hours a day. All minors must be reported.

There are three inspectors who visit bakeries. They are:

1. Inspector of health and cleanliness.
2. Inspector of boilers, to see if boilers have over twenty pounds of steam.
3. Inspector of elevators.

The owner of the bakery then told us that there were not State requirements in Pennsylvania for packing and shipping bread, but that Ohio and New York have such requirements. He also told us that New York and Ohio require the weight of the bread to be stamped on the wrapper or on the bread itself. Pennsylvania does not require this of its bakeries.

The State does not require any methods of fire protection. That is entirely up to the individual himself, but the State does require that the bakery shall carry compensation for its employees. If a man is hurt by some accident while at work he receives one-half of his wages as compensation.

We then inquired if the bread must be sold at any certain price. We were told that it need not be, but that the price was fixed according to the cost of the raw materials and overhead expenses.

A bakery cannot use inferior products, because they would be harmful in bread, cakes, or pies and in that way kill trade. But substitutes for flour can be used.

When oleomargarine is used a report must be sent to Pittsburgh, Pennsylvania.

The State does not send the baker any pamphlets, but certain companies put out books which aid the bakers. A magazine is issued named the Bakers Weekly.

After being shown the machinery and equipment we left, all feeling greatly benefitted by our trip.

Baker's License. No. 1110. Inspection report No. 547. Dated May 7, 1921. Pennsylvania Baking Certificate. Department of Labor and Industry. Harrisburg, Pennsylvania, July 8, 1921. To whom it may concern:

This is to certify, that an inspector of the Department of Labor and Industry has inspected the premises, 615 Main Street, Clarion, Pennsylvania, the first floor of which is used as a bakery; and finds the same to be in a safe and sanitary condition, in conformity with the Pennsylvania Bakery Law and Industrial Board Regulation.

This certificate is issued on the application of M. R. Kuhn, proprietor of, said bakery, and applies only to that portion of the above premises specifically mentioned and is operative only so long as compliance with the said law and regulation continues.

JOHN WALKER, *Chief Inspector.*
CLIFFORD B. CONNELLY, *Commissioner.*

CIVICS

II. A TRIP TO THE COURT HOUSE

I. Aim: To link lessons on Courts in classroom with actualities outside of classroom.

II. Preparation

A. Before taking the journey the class discussed—
1. Importance of courts
2. Respect due courts and court officers
3. Things they would see
4. Necessity for observing everything they could (Class was advised that the next lesson would be a discussion of the things seen and the reasons or causes for them).

B. Time

It has been found to be very desirable to select the first or last periods of the afternoon for the travel lesson because of the additional time that can be used if the teacher is willing.

III. The visit to the Court House—The class noting the following—

1. Interior arrangement
2. The different officials and what they did
3. Other personages present and what they did
4. The proceedings
5. Important incidents

IV. Next day in classroom:

A. Subject—Courts.

B. Aim—To discuss courts and their purpose.

C. Procedure—Turn to page 298 in your text. Is this like the court room you visited? (It is not.) Let's draw a diagram of the court room we saw. See if you can have yours finished before I have mine on the blackboard. (Teacher is a little slow in starting so that her work may not be a model for pupils.) Check—Where did the Judge sit? Who was he?

The Jury? How many? The man accused? His lawyer? Of what was he accused? Who accused him? Where did the Commonwealth's lawyer or District Attorney sit? Who was the man who gave the oath to the witnesses? Where did the witness sit when testifying? Who were these people who sat in chairs opposite the jury? The people behind this railing? What kind of case was this? What is the difference between Criminal and Civil cases? Which would the following be?

1. A man signs another man's name to a check. (This is forgery.)
2. A man kills another.
3. Selling liquor.
4. Stealing a car.
5. Claiming some land which another person claims.

What do you think should be the verdict in this particular case that you heard? Tomorrow look in the paper and bring all the clippings you can find regarding this case. Would you like to live in a county where there were no courts? Why not? (Purpose of courts is brought out by leading questions.)

D. Conclusion—Take a fresh sheet of paper and answer the following questions:
   1. What is the purpose of Courts?
   2. Who is the person who brings the case?
   3. Who is the person against whom the case is brought?
   4. What kind of case was this?
   5. What is the difference between a Criminal and a Civil case?

   Hand in your papers.

E. Results
   1. Those we sought
      a. To create interest.
      b. To secure a definite impression of the value and purpose of courts.
   2. Those we secured
      a. Created intense interest.
      b. Clear conception of courts.
      c. Developed new ideas of citizenship.
      d. Pupils secured clippings of all kinds of court news and we found it necessary at a later lesson to list the cases.

GEOGRAPHY

Land and water forms and their relative positions, sky features, forests, mineral deposits (ores, stones, clays), types of soil, relative locations of industrial (including agricultural) and residential sections, types of homes, museums, educational and religious institutions, varieties and types of occupations of the people (inquire concerning sources of raw materials and markets for finished products), means of transportation and communication (land, water, air), other uses of land as forest and game reserves, flood control areas, dam for water power reservoirs, summer or winter pleasure resorts. (Seek constantly the relationship between the cultural features, or works of man, and the natural conditions of the environment.)

GEOGRAPHY

I. A TRIP TO THE FARM

(Grade I)

1. Background of experiences leading to trip:

In the spring the kindergarten children planted pumpkin seeds and popcorn in the class garden. In the fall these children who are now first grade children visited the garden to see the pumpkins. In October the pumpkins were taken to the school, and used to make jack-o'-lanterns for the Hallowe'en festival. The corn was cut and shocked. The ears were broken off, husked and put away to dry for popping. The stalks were used for decorations for the Hallowe'en party. The children learned that corn stalks were used for food for cattle. This led to an interest in farm animals. Some of the children had been to farms, and had seen many interesting things. Out of the garden experiences and some of the children's experiences on farms, came the desire of the class to visit a farm.

2. Preparation for the trip:

a. Using pictures and experiences to stimulate an interest in the trip to the farm.
b. Deciding when, where, and how to go.
c. Planning for a safe trip.
d. Planning what to look for on the trip.
e. Formulating questions to be asked while on the trip—
Does the farmer raise corn? What does he do with it?
Why does the farmer plant his pumpkins in the cornfield?
Where does he keep his corn after he cuts it?
What animals like to eat corn?
What is a silo?
What other things does the farmer raise?
f. Assigning questions to different children.

3. The trip:

We wanted to visit a farm to see where vegetables grow.

We wanted to see the farmer's animals, and to find out something about them. The father of one of the girl's had a farm and we went to visit it.

How we went to the farm—
We walked to the farm.
We went over the football field and up the road.
Our teacher went with us.

What we saw on the way to the farm—
We saw some chickens.
We passed many gardens.
We saw some cabbages.
We saw a barn.
A big wagon full of wood passed us.

What we did at the farm—
We ran through the fields.
We went to the duck pond.
We saw duck eggs.
We went to the barn.
We saw the animals.
We asked the farmer some questions.
We learned many things.
There were big hills where the corn was piled up.

The farm animals—
Two cows were eating grass.
One cow looked at us and said, "Moo, Moo".
One horse was eating feed.
Seven ducks were walking around.
Four rabbits were in the pen.
We fed the rabbits some grass.
Many chickens were in the coops.
We looked at the chickens, and the chickens looked at us.
The farmer said that the chickens laid many eggs.

4. Outcomes of the trip leading to worth while activities:

a. Making of record of the trip to be read, and to be shared by others.
b. Making pictures to illustrate the trip.
c. Increased interest in the farm animals leading to a more detailed study.
d. Some appreciation of the work of the farmer.
e. Interest in the kind of food that children should eat.
f. Desire to visit the grocery store to see food that does not come from the farm.
g. Desire to improve writing of names to put in the book.

5. Teacher's purpose:

a. To help the child to come into real contact with farm life, and to gain a better understanding of it.
b. To help the child to get some idea of his dependence upon the farmer for food.
c. To gain first-hand information about farm life.

GEOGRAPHY

II. A JOURNEY TO AN AUTOMOBILE TIRE PLANT

(Sixth Grade)

I. Children's aims:
   A. To see how a rubber tire is really made.
   B. To clear up certain hazy ideas concerning the materials which go into the manufacture of an automobile tire.
   C. To learn if most of the rubber used in the local factory comes from Brazil or from Malay.
   D. To find out where the cotton fiber comes from.
   E. To discover where the tires are sent.

II. The teacher's aims:
   A. To give the children experience in securing information from people and from observation.
      Example—
      1. Find out from the manager of the tire plant the sources of the raw materials—rubber, cotton.
      2. To learn by careful observation and questions how the tread is put on the tires.
   B. To give the children practice in formulating questions and in organizing information. Teacher: "What questions do you want to ask at the factory?" Questions will be suggested, and written on the board. The class will eliminate some, combine others, and reword the questions until they are satisfactory.

III. Method:
   A. A committee was appointed to secure permission to visit the plant, to make arrangements as to time, and to obtain a guide. (The teacher had already visited the factory and discussed with the manager the possibility of such a trip.)
   B. The day before the visit, the teacher planned her lesson carefully.
   C. The children reviewed their information concerning rubber and rubber products. They made the following list of questions which they wished answered.
      1. From what places does most of the rubber used in this factory come?
      2. What does it look like when it arrives?
      3. What has to be done to it?
      4. What other materials go into the manufacture of a tire?
      (Some of the children refused to give up the idea that the tires were chiefly made of rubber.)

      5. How is the tread pattern put on the tires?
      6. Why are tires so expensive?
      7. What is meant by vulcanizing? (This was a question from the girls. They had not been able to understand vulcanizing either from the boys' explanation or from the description in their books.)
      8. Where are the tires sent?

IV. At the plant:
   A. The class was taken through the plant in groups of seven to ten. The spokesman of each group asked questions after the guide had given his explanation of each step. Other members of the class asked questions if they did not understand or wanted more information. The class secured specimens of rubber at various stages of manufacture, some cotton fabric and a cross section of a tire.

V. Checking results:
   A. The next day the class discussed the trip, using their questions as a basis. They learned that most of the rubber used came from Malasia; that the cotton fiber came from our southern states; that the tires were sent to the larger cities in Eastern United States to be distributed to automobile agents in smaller places. Different members of the class brought out many additional bits of information. They explained how certain hazy ideas had been cleared up.
   B. As the discussion proceeded, an outline of the work in the factory was developed on the board as follows:
      1. The smoked sheet of rubber—description, where obtained, how previously treated, cost.
      2. Preparation of the raw rubber—materials added, process.
      3. Process of making the core part of the tire—analogy to a food grinder, cutting in lengths.
      4. Application of rubberized cotton fabric—how rubber is added by means of calender, number of ply added to a Ford tire.
      5. How tread is added upon a revolving wheel-like apparatus—by hand or by machine.
      6. Vulcanization—insertion of air bag, putting into molds, lowering into vulcanizer, how long "baked", how removed.
      7. Inner tubes—material used, process of making, how ends of tube are joined together.
      8. Wrapping of tires—the machines that wind the strip of paper about it, the part of the process in handwork.

C. A group in the class volunteered to make a chart, using: the specimens from the factory, a description of the trip, an outline, pictures, maps.

GEOGRAPHY

III. TRIP TO A DAIRY FARM

I. Preliminary Work:

A. Teacher Preparation

1. Made the trip before taking children.
2. Formulated definite geographic purposes for taking the children on this particular trip.
3. Conferred with principal concerning trip to be taken.
4. Planned route in detail.

B. Classroom Work

1. Motivated the trip—(it should be the result of a felt need on part of the children).
2. Children set up their objectives. (These aims should be geographic.)
3. Children and teacher planned the trip in detail.

C. Materials

1. Compass, printed map of district.
2. Cross-section paper for sketching map enroute.
3. Containers for carrying any specimens collected on the trip.
4. Camera—the teacher and some of the pupils owned cameras.

II. The Trip: Children and teacher walked from the school building to the dairy farm. The time was late spring.

A. The Work of the Teacher

1. Helped the children to study landscape. This was done by giving the children something definite to look for but in such a way that the problems became the children's own.
2. Held each child responsible for seeing certain definite facts and situations.
3. Checked children's observations, as largely as possible, in the field.

B. The Children's Part in the Trip

Studied landscape along the way as well as at the dairy farm. They saw cultural features or the work of man, the physical features and the reasons for them; and then they studied these factors with the purpose of seeing the relationships between them.

Example—Three types of specialized farming were seen.

1. Truck farming—
   a. What use is man making of this section of land?
   b. How do you know?
      Signs of market gardening.
      Kinds of crops to be seen.
      Manner of cultivation.
      Truck loaded with vegetables, ready to be taken to market.
   c. Why is it used for market gardening?
      Climate,
         Length of growing season—Why?
         Precipitation during growing season—Why?
      Topography.
      Soil.
      Resulting drainage.
      Position relative to market.
   d. Transportation facilities—What? Where? Why?

2. Fruit farming section, adjacent to the truck section.
   a. Pupils recognized this new type by the following:
      Orchards rather than fields.
      Size of orchards.
      Cold storage houses, etc.
   b. Kinds of fruits grown here.
   c. Why the people are interested in these fruits?
      Climate,
         Length of growing season.
         Summer and winter temperature and precipitation.
      Account for these climatic conditions,
         Surface—Why?
         Location of orchards, slopes or low flat land—Why?
         Which side of slope—Why?
      Kind of soil—Why?
      Market—transportation facilities—What? Why?
      Human factor, etc.

3. Dairy farming—

Signs: silo, cows, certain types of cow sheds, etc. Children were shown main points of interest on the farm by the owner who explained the various phases of dairy farming.

a. Cows in pasture
   Reasons for this part of farm being devoted to pasture.
   Kinds of cows—Why?
b. Plan of barn and cow sheds—Why?
   Work of the dairy farm, care of cows.
   Sanitary measures—care of milk, etc.
   Market.
c. Poultry—Why this minor industry?
   Kinds of poultry—Why these?
d. Transportation,
   Where are the roads, railroad, bridges, of this section?
   Why so located?

4. Returned to school building—chief use of land on return trip compared with that on way to dairy farm.

Throughout the trip, every opportunity to build up vocabulary by means of imagery based on concrete situations was utilized, such as developing concepts of stream. valley, hill, soil, drainage, watershed, shipping center, railroad junction, aviation field, while children's attention was focused on the actual illustration.

III. Classroom Work After the Trip:

A. Reviewed trip and listed unanswered questions.

B. Research—Found desired information to answer questions.

C. Children chose most important geographic information and underlying geographic principles, organized this material and developed an outline. Each child held responsible for essential material and placed original map of trip also in his notebook.

D. Suggestions for future Expression Work—
Booklet, Posters, Schoolroom movie, Exhibit, etc.

HEALTH

Personal health activities, home sanitation and ventilation, street cleaning, food markets, water supply stations, (filter plants), health bureaus, recreational facilities, clinics, sewers and sewage disposal, milk stations, open-air schools, parks and playgrounds.

HEALTH

A JOURNEY WITH A HEALTH OBJECTIVE

(Sixth Grade)

Place: The Hosfeld Furniture Factory.

Teacher's Objective: To show some of the factors influencing the health of the worker.

Pupils' Objective: To appreciate how employers in factories safeguard the health of their employees.

Preparation: Pupils had been studying personal hygiene in relation to industry. They had learned the individual's responsibility in regard to health. The following problem was discussed before the journey.

I. Problem—If you were working in a factory, what safeguards for your health would you wish to have your employer provide?

Outline of Discussion

Eyes
- Provision of light
  - Natural (direction)
  - Artificial (direction)
- Protection from glare
  - Finish of walls and furnishings
  - Reflections from outside
- Protection from dust

Ears
- Absorption of noise

Nose and Throat
- Protection from dust and fumes
- Provision for humidity

Cleanliness of the Body
- Clean surroundings
- Lavatories
- Toilets
- Lunch room
- Recreation room and grounds

Posture of the Body
- Standing (change)
- Sitting (chairs adjustable)
- Walking (carrying heavy loads)

Nourishment of the Body
- Good water supply
- Clean food if supplied
- Lunchroom
  - Clean, comfortable, attractive

Protection of Body from Accident
- Placing of machinery
- Saws covered
- Belts covered
- Requirements in dress

Protection of Body from Disease
- Health examinations required
- Vaccination required
- Expectorations forbidden
- Ventilation provided
- Temperature correct for workers

Provision for First Aid

Welfare Service
- Educational
- Medical and Nursing
- Recreational

II. The Journey: Walked to the Hosfeld Furniture Factory

At the Factory

1. Departments visited,
   a. Machine Room
   b. Assembling Room
   c. Varnishing Room
   d. Finishing Room
   e. Packing Room
2. Seen and noted—
   a. Devices for
      - Protection from physical injury—saws covered
      - Protection from dust—fans; pipes carrying dust to furnace
      - Protection from disease—placards "Spitting on floor positively prohibited"
   b. Means of ventilation
   c. Lighting system,
      - Placement of windows
      - Color of walls
      - Placement or location of machinery
   d. Heating system
3. Class discussion and appraisement of health facilities

HISTORY

Anniversary day celebrations

Battle fields

Beginnings of movements, industries

Collections or exhibits that show the evolution of home, lighting, heating, means of communication and transportation

Evidences of past life, customs, utensils

Forts

Homes—of historic persons, meetings

Markers—of events, lines, sites, spots

Milestones—evidences of progress, marks of the past, original sites

Museums—collections of historic documents, materials

Relics—Indian, Eskimo, cliff or cave dwellers; primitive, early and past life

Shrines—buildings, cemeteries

HISTORY

I. A THIRD GRADE JOURNEY

Introduction

While studying Hiawatha, the children were much surprised to learn that Indians ever lived in the vicinity of Kutztown. This led to discussion of the early settlement of the community, and eventually to a school journey.

Kutztown's Historic Places

A. One of the oldest houses—White Oak Street
B. The first school building—Walnut Street
C. Swan Inn—Main Street
D. Site of Indian Caches—Lenni Street
E. Indian burial ground—two miles west of Kutztown

Transportation

Walked to A, B, C, and D.
Bus to E ($10 for whole school)
Time—1:00 to 3:00 p. m., March 22

Preparation

Map of Kutztown
Kutztown Centennial Book, containing pictures and descriptions
Present appearance and use of these places—

A. Old House—used for harness shop
B. First school building—used as a residence
C. Swan Inn—residence of Mr. Zach. Hoch
D. Site of Indian caches—street corner and lot
E. Indian burial ground—woods on Biehl farm

Descriptions and incidents

A. Old house—made of stone (no wood except scrub oak).
B. First school building—dedicated in 1791; 2 rooms; German taught all of the time, English taught in winter; teacher paid one or two cents a day by each pupil; teacher lived in the school building.
C. Swan Inn—sign, picture of a swan; bricks brought from England; Arch in cellar used as storage room, rumored that two Revolutionary soldiers were concealed here at one time; Revolutionary soldiers en route from Carlisle, Pennsylvania, to Cambridge, Massachusetts, spent night here.

D. Indian caches—Three discovered while grading Lenni Street in 1900; street named for Lenni Lenape tribe who lived along Saucony Creek, in southern part of what is now Kutztown. Another cache, discovered while digging post-hole, contained many relics. Most unusual relic was Delaware Indian pot with pointed base and flaring rim, sides covered with cord marks, height 11 inches, greatest diameter 9½ inches; now in State Museum at Harrisburg.

E. Indian burial ground—relics found in 1847, kettles, beads, gun-lock, etc. Five graves opened in 1901 contained adult human bones, evidently "bundle burial." Also contained beads, clay pipes, thimbles and an iron cup.

Trip: Children's questions and comments.

A. *Old House*—How very small this house is! Who built it? How many children were in the family? Why is there no porch? Where were the neighbors' houses?

B. *School Building*—Gee! This is small towards ours! What kind of desks did they have?

C. *Swan Inn*—Where is the sign? What do they keep in the arch now?

D. *Indian Caches*—Where are the relics that were taken out of these caches? Why did the Indians keep food in these "holes"? Did the Indians cover the caches with earth? Where were the wigwams?

E. *Indian Burial Ground*—Why did the Indians bury beads, kettles, etc. with their dead? What was done with the bones and relics that were dug up? May we dig and see if we can find some bones and relics?

Return:

(1) Children wrote an article for local newspaper.

(2) Children entertained pupils of other grades by telling of the trip and the history connected with it.

(3) Children plan two more excursions—

a. Antique shops of Kutztown.

b. Trip east on Wm. Penn Highway, visiting the Old Oak Tree, Kemp's Tavern, and the Monterey antique shop.

HISTORY

II. VISUAL HELPS IN TEACHING THE GEORGE ROGERS CLARK EXPEDITIONS

I. Objective: To teach how these expeditions helped to establish the Mississippi River as the western boundary of the United States at the close of the Revolutionary War.

II. Materials:

1. Opaque projector pictures
   a. General George Rogers Clark
   b. An Indian Chief
   c. A surveying party
   d. A river flatboat
   e. An ox team
   f. Clark's last home on the Ohio River
2. Maps
   a. Hart—American History Series Revolutionary War—(A-8), a large wall map.
   b. A large relief map of United States.
3. Diagrams or sketches—
   a. An outline map, showing Clark's complete 1200 mile journey
   b. An outline map on a larger scale, showing his route from Brownsville to Pittsburgh
   c. An outline map, showing his route from the Ohio River to Forts Kashaskia and Vincennes
   d. A drawing of Fort Sackvill, at Vincennes on the Wabash River

III. The Journey: The teacher and the class walked to the bank of the Monongahela River at California, Pennsylvania.

Teacher: This river looks very peaceful today.
Has it ever been the scene of a military expedition?

Pupils: Several pupils mentioned that Washington had travelled on this river.
Pupil C, incorrectly stated that General Braddock had transported his troops on this river.
(Note: Not one pupil knew about Clark's expedition passing this point.)

Teacher: Where could an expedition go if it follows this river?

Pupil E.: It could go to Pittsburgh.

Pupil G.: It could go on down the Ohio River.

Teacher: At this point, the teacher explained about the building of rafts at Brownsville which is located three miles above California; about the expedition passing California on the journey down the river; thence on to Pitsburgh and down the Ohio River.

Pupil A.: Where did General Clark get his army?

Teacher: The teacher described Clark's journey from Kentucky to Virginia; and how he assembled his army.

Teacher: Why did these men use this river instead of travelling in some other way?

Pupil N.: It is the shortest way.

Pupil H.: It is the easiest way to travel.

Teacher: The teacher gave a description of their going down the river, the collecting of supplies, and the settlers at Pittsburgh.

Pupil M.: Why was this expedition undertaken?

Pupil A.: Members of the party intended to make settlements in the Ohio Valley.

Pupil F.: They intended to capture Fort Duquesne.

Pupil D.: They intended to drive out the French settlers from the Ohio Valley.

Teacher: The following were the purposes of the expedition:

1. To protect the Kentucky settlers.
2. To gain the Ohio Valley and the Great Lake regions for the American Colonies.
3. To capture forts held by the British and by the French and Indians.
4. To win the friendship of the French and Indians and to gain their support against the British.

Teacher: Draw in your history notebooks a picture of the Monongahela River, with an imaginary raft, loaded with soldiers, ammunitions and supplies.

IV. Assignment: Pupils will finish their drawings and do the assigned readings. At the next class period the discussion will be continued, making use of the pupils' readings and of the pictures, diagrams and maps shown by use of an opaque machine.

LITERATURE

Homes of authors, book shops, libraries, literary shrines, settings or backgrounds of stories, haunts of authors.

LITERATURE

I. A JOURNEY TO A BOOK STORE

Aim: To stimulate interest in books and reading by acquainting pupils with the attractions and resources of book shops.

Preliminary Recitation

I. Talk on book ownership and building up a private library:

1. Association with books
   a. Information
   b. Inspiration.
   c. Recreation
2. Borrowing of books from school and public libraries.
3. Book purchase. Expenditure for books compared with that for moving pictures, ice cream, candy, etc.
4. Principles of choice for purchase
   a. Book lists and reviews
   b. Editions,
      Binding
      Series
      Illustrations
   c. Books for gifts
   d. Second hand books
5. Book stores
   a. In department stores
   b. Combined with stationery
   c. Combined with art shops
   d. The separate book shop
   e. The separate shop owned by women

II. Preparation for the school journey:

1. Organization of class into groups of four.
   Each group to be assigned time for journey
   Each group to visit each book store on list provided
2. Each student to be supplied with list of points to be observed and noted in each store—
   a. Ascertain the exact name of the firm
   b. Is the book store a separate shop or part of a department store?
   c. If a separate shop consider the type of building, interior and exterior. Atmosphere.
   d. Other merchandise sold, e.g. art objects, antiques, stamps.

   e. Type of magazines sold. Book reviews.
   f. Does the stock include second hand books?
      Second hand magazines, bound or unbound?
   g. Book displays, on tables or shelves, in windows.
   h. Stock of children's books. Authors. Titles.
      Physical make-up. Prices.
   i. Obtain the name of the author, Title, publisher and price of the book you would most like to buy.

In the recitation following the journey there should be class discussion based on reports, and the assignment of an essay on some topic chosen from a list like the following:

A Day in a Book Shop
A Night in a Book
Customers in a Book Shop
Why I Would Like to Sell Books

References

Books

Bennett. What books can do for you. Doran c 1923.
Counsel upon the reading of books, by H. Morse Stephens and others.

Newton. The amenities of book-collecting. A. M. Press c 1918

Smith. What can literature do for me? Doubleday c 1913.

Morley. Haunted book-shop. (Fiction)

Morley. Parnassus on wheels. (Fiction)

Periodicals

Bookshop for boys and girls. Review of Reviews vol. 56, p. 657-8, Dec. 1917.

Little bookshops run by women, by H. J. Keith. Independent vol. 111, p. 276-7. Dec. 8, 1923.

New Profession for women, by E. Barnes. Atlantic vol. 116, p. 225-34, Aug. 1915.

Sunwise turn: a bookshop plus, H. White. Independent vol. 88, p. 280. Nov. 13, 1916.

LITERATURE

II. PRELUDE TO THE VISION OF SIR LAUNFAL PART I

(Eighth Grade)

The Teacher's Aim — To have the children understand to some degree the outdoors and the poem—and to see that each is beautiful.

Children's Aim — To spend a happy time in observation and discovery.

Place — A spot near a stream which is shaded on the north side by trees, elms, maples, and an occasional oak. On this same side the wooded space extends in a level stretch for about a hundred feet, then rises in an abrupt bank, the top of which is scarcely discernable for trees and bushes. On the south side of the stream the country stretches away in farmland. Two farm houses are in the near distance. Along the stream, sometimes in it, graze and stand horses and cows. This spot furnishes wood, stream and farm—in a perfect background for the poem.

Time — A sunny day in late May. (In this country May is equivalent in warmth and freshness to the New England June.)

Procedure — The group strolls about, each person intent upon his own observations; occasionally someone calls the attention of the teacher and nearby pupils to certain objects. Sometimes the teacher points out a discovery. They find buttercups, cowslips, a jack-in-the-pulpit, violets, dandelions, some less common flowers; they see several birds' nests, and one boy discovers frogs' eggs.

Finally the group comes together under a large elm and seat themselves on the ground. There is almost perfect quiet as the children are intent upon seeing and hearing.

Teacher — Let us sit in quiet and listen. In a few moments we will talk about what we hear.

Almost certainly a meadow lark on the other side of the stream gives his plaintive note. Then a bird begins to sing in a nearby tree

whose branches are almost overhead. (Providence might grant that it be a blue bird or an oriole or a cardinal, but nature is more apt to permit it to be a song sparrow or a robin.) The children all smile and become extremely alert; one boy imitates the call so accurately that the bird hops nearer in curiosity. Another bird calls from farther off. The class watches and listens with pleasure until the bird takes flight and flies to a more distant tree. A cow calls to her calf and the distant sound of barnyard fowls reach the ear. Finally the teacher asks, "When the birds and animals are quiet, do you hear any sounds?" They listen.

First Pupil — Yes, the brook.

Second Pupil — The hum of bees.

Third Pupil — The wind in the trees.

Teacher — Life murmuring, isn't it? (The phrase pleases some of them.)

Teacher — While we sit here I am going to read you a part of a poem. I think you'll find that the poem talks only of the things that you feel, and see, and hear as you sit here.

A part of the Prelude to Part I of "The Vision of Sir Launfal" is read, beginning with "And what is so rare as a day in June" and continuing to the end of the Prelude.

As the reading proceeds all the senses are alert to catch sights, sounds, and odors. After the reading is finished there is a bit of talk after which the class returns to the town.

The following day, or soon after, the remainder of Part I of the poem is read and discussed.

It would be possible, and probably preferable, to read the second part of the poem in winter, when the Prelude could be read immediately after the school journey to the same stream described above. Part II could be reread after the summer field trip, for the sake of contrast.

MATHEMATICS

1. Form shape, size and position of objects involved in our experience

2. Situations involving comparison, computation, measurements.

ARITHMETIC

OUTDOOR ARITHMETIC

I. Topic	Units of area—the square yard, the square rod, the acre.
II. Teacher's aim	To develop proper concepts of standard area units.
III. Pupils' aims	To get correct images of a suare yard, a square rod, an acre.
IV. Materials	A ball of strong twine, 850 feet long. A carpenter's square. A yard stick. 100 foot steel tape. A dozen stakes.
V. Introduction (Teacher to Class)	We have learned that a yard is three feet and is used as a measure for selling commodities such as cloth, ribbons, carpet, etc. Today we shall try to get a correct picture of a square yard, used by painters, plasterers, contractors, in computing areas.
VI. Procedure	Class goes to the school yard for the lesson— A. Class is divided into groups of four, two to draw or measure and two to check. B. Each group does the following— 1. Draw a line one yard (3 feet) long 2. At each end and on same side of line by means of carpenter's square, draw a second and a third line one yard long at right angles to the first. 3. Connect the ends.

Teacher—What do we now see?
Pupils—A surface three feet long and three feet wide enclosed by four lines at right angles.
Teacher—Has the figure length?
Pupils—Yes.
Teacher—Has it breadth?
Pupils—It has.
Teacher—Has it depth?
Pupils—It has not.
Teacher—What is the figure called?
Pupils—A square yard.
Teacher—What is this unit of measure used for?
Pupils—To measure areas?

VII. A Square Rod

Each group was asked to do the following:

1. Draw a straight line five and one-half yards (16½ feet) long.
2. At each end and on the same side, place a carpenter's square so as to form a right angle and draw a second and third line sixteen and one-half feet long at right angles to the first. To insure a straight line the Pythagorean theorem was used. Distances of 4′ and 3′ respectively were measured off on the two lines; The hypotenuse 5′ determined the location of the stake on the new line. This, repeated at 12′ and 9′ and at 16′ and 12′ respectively was continued throughout the construction of the figure. Stakes were driven for sighting purposes.
3. Connect the ends.

Teacher—What do we now see?

Pupil A—A square sixteen and one-half feet long and sixteen and one-half feet wide.

Pupil B—A square five and one-half yards long and five and one-half yards wide.

Pupil C—A square one rod long and one rod wide.

Pupil D—A square rod.

Teacher—Has it length, breadth and thickness?

Pupil E—It has length and breadth but not depth or thickness. It is a surface only.

VIII. An Acre

Teacher: A square acre is 208.71 feet (approximately 209 feet) long and wide. How shall we lay out an acre?

Pupils: Drive four stakes in the ground, at the corners of a square 209 feet on each side. Lay it out as we did the square rod.

Teacher: About what is the length of the step you take?

Pupils: About three feet.

Teacher: Suppose we form a line and step seventy paces. This will give us an idea of 210 feet.

Pupils form a line. The two end pupils remain as markers. The other members of the class take seventy paces, (teacher steps with them). Two pupils measured and found the distance to be 212 feet.

Six pupils were then selected to plot an acre by stepping the distance.

Turning their backs, two pupils started in opposite directions, paced thirty-five steps and stood as markers.

From these points, two other boys faced directly east, took seventy paces and stood as markers.

The two check boys made some adjustments but the verdict of the class members was that the figure was not exactly a square.

The remaining members of the class then proceeded to lay out an acre as follows:

Pupils A and B measured a line 209 feet long.

Pupils C and D drove stakes at the ends.

Pupil E, at one end, used a carpenter's square to form a right angle.

Three pupils made use of the Pythagorean theorem, located points at 60, 120, 180 and 210 feet, at which pupils were stationed for sighting purposes.

Pupil F drove a stake at 209 feet. Twine was attached to first stake, stretched around second stake and carried on to the third one.

Pupil G used carpenter's square at this stake to form right angle.

Pupils measured, used the Pythagorean theorem as before, and located pupils for sighting purposes 60 feet apart. At a point 209 feet on this line, the fourth stake was driven.

The Pythagorean theorem was again used to check the results and the stake placed accordingly. Twine was passed around the third and fourth stakes and brought to the first stake completing the square.

Teacher: What is the enclosed area?

Pupils: A square acre.

Teacher: How long is a square acre in feet?

Pupil M: About 209 feet.

Teacher: Must an acre be square?

Pupil X: No, it may be a rectangle.

Pupil Y: It may be a triangle.

Pupil Z: It may be a circle, or any kind of figure, if it contains 160 square rods or 43,560 square feet.

Teacher: Measure the school plot; make a drawing of it; determine its area in acres.

MUSIC

Music institutions, music museums, music libraries, homes of musicians, scenes which inspired music compositions, outdoor and indoor public concerts.

MUSIC

A JOURNEY WITH A MUSIC INTEREST

Place	The Stephen Collins Foster Home
Time	Saturday morning
Teacher's Aim	To develop an appreciation of the music of Pennsylvanians
Students' Aim	To learn something about the life and music of Foster
Preparation	Ascertained the location of the Foster Home and read the following books: Stephen Collins Foster by Harold Vincent Milligan; Catalogue of First Editions of Stephen C. Foster by Whittlesey and Sonneck; A Biography of Stephen C. Foster by Morrison Foster.
The Journey	Took car number 88 at the Pennsylvania Station, Pittsburgh, and rode to corner of Thirty-sixth Street and Penn Avenue where the Foster Home is located.
In the Home	At the entrance, the party was met by Mrs. Dorothy Jane Rose, granddaughter of Stephen Collins Foster, who acted as guide through the museum.

Foster Relics Inspected—

1. Photographs of Foster, his mother, his father, and his wife.
2. Photographic print of Susan E. Pentland, to whom "Open Thy Lattice, Love" was dedicated.
3. A flageolet, flute, guitar owned by Foster.
4. The first piano to cross the Alleghenies upon which Foster played in composing several compositions.
5. Original manuscript of "Open Thy Lattice, Love."
6. Original manuscript of "Little Ella."
7. Original manuscript of "Maggie by My Side."

Teacher: Mrs. Rose, will it be possible to meet your mother?

Mrs. Rose: I shall ask her to step into the Museum for a few moments.

(Mrs. Marion Foster Welch, only daughter of Stephen Collins Foster, appears and greets the group.)

Teacher: Mrs. Welch, will you please tell us some memories of your distinguished father?

Mrs. Welch: I was quite young when my father died but I remember well his ability to play many instruments—the piano, flute, flageolet, clarinet and guitar. He had a natural genius for music and learned to play instruments readily. He had a sweet voice, too, and used to sing so softly and tenderly to his own accompaniment that I still carry the picture. Father also took great interest in water color work.

Teacher: Do you have any special favorites amony your father's music?

Mrs. Welch: Of course, I love all of father's music. His compositions are dear to me. At his funeral, the band played "Come where My Love Lies Dreaming" while his body was being lowered into the grave. Perhaps that is my favorite. You will please excuse me now.

Teacher: In behalf of the group, I thank you for the honor you have done us and for your kindness.

Mrs. Rose to a pupil: What is your favorite composition?

Pupil: "Old Black Joe".

Mrs. Rose: Joe (Old Black Joe) was a colored man who drove for Dr. McDowell, father of grandmother Foster. Among his duties, was that of admitting visitors to the home in the evenings. All through the sweetheart days, Joe watched Grandpa Foster come and go and was the medium through which the flowers passed from him to grandmother. One evening as Grandfather Foster passed through the doorway, he said "Joe, some day I am going to put you in a song." He never forgot the promise. Old Black Joe was gone when the day of inspiration came but his memory lives in the song which bears his name.

Another Pupil. Tell us about Kentucky Home and Swanee River, Mrs. Rose, please.

Mrs. Rose. Grandfather got the picture he painted in these songs during a visit to his cousin Judge John Rowan at Federal Hill, near Bardstown, Kentucky. There he saw the slaves in happy surroundings, treated kindly and considerately. He was interested in what they did and how they lived. You find these described in the songs.

The word Swanee, a river in Florida, was supplied by Morrison Foster, grandfather's brother, because a word of two syllables was needed. The soul speaks in this song and it is considered one of grandfather's greatest compositions.

There is a story of some kind connected with most of grandfather's songs. "Where is Thy Spirit, Mary" followed the death of a very early sweetheart, Mary Keller. Grandfather's love for his mother is seen in "A Dream of My Mother and My Home," "Kiss Me, Dear Mother," "Farewell, Sweet Mother." A deep love for his wife is shown in "Jenny's Coming O'er the Green," "Jenny June," "Jennie With the Light Brown Hair," "Come Where My Love Lies Dreaming."

He wrote many hymns in the last years of his life. Such hymns as "Suffer Little Children to Come Unto Me," "Tears Bring Thoughts of Heaven," "There is a Land of Love," "We'll All Meet Our Saviour"—do they not speak of grandfather's abiding faith in God?

I hope you have enjoyed your visit. Please come again.

Teacher: The pupils and I are deeply grateful for your kindness and for the interesting background you have given of your grandfather's music. Knowing the occasions out of which they grew, we shall sing these songs with greater understanding in the future.

NATURE STUDY AND SCIENCE

Animal life—birds, aquatic life, insects, farm animals.

Astronomical Phenomena—stars, planets, sky.

Flowers, plants, trees.

Engineering projects.

Industries—agricultural, manufacturing.

Museums and Parks.

Natural Phenomena—caves, gaps, erosion.

ELEMENTARY SCIENCE

I. A WALK WITH NATURE

I. Introduction

If field trips can be carried out, a greater interest in getting into the open will be created. The walks will be taken not alone for the air, but to enjoy intelligently what is seen—the materials that nature uses, how she uses them, where she puts them, and how she arranges them.

II. Objectives

A. Some of Butler County's best landscape views.
B. An earth crack.
C. A strawberry that is green when ripe.
D. Flowering dogwood.

III. Directions

A. Leaving North Hall, walk northward, directly toward the athletic field. Arriving there, right about face and enjoy the view of rolling country, forest areas, open stretches, Slippery Rock Borough, and the Normal School building right at your feet. This is one of the highest points in Butler County, approximately 1300 feet above sea level.

Still facing south, the row of hills in the distance is called the terminal moraine. This is where many thousands of years ago a huge mass of ice (glacier) came down from the north and finding it too hot melted. It would be interesting to study the plants on either side of these hills because the soil over which the ice passed is somewhat different from that further south. These hills which you see represent the debris dropped and the soil pushed up at the edge of this great moving piece of ice.

Questions

1. How will you determine the north?
2. What is the reason for a hill? Explain how these hills came to be.
3. Is 1300 feet a great height to be above sea level?
4. What is a moraine, ice, glacier?
5. When does ice melt?
6. Are there glaciers in this part of the country?

B. Right about face; cross the athletic field, noting the boulders dropped by the sheet of ice. In about the middle of the field, where it begins to slope slightly to the west, a series of cracks in the soil one to three inches wide and a foot or more deep will be found. At one place instead of a crack, the soil has dropped down forming a ditch. This is the result of a miniature earthquake, caused by a local coal mine, which is many feet below, the entrance of which is in the rear of the school campus.

Questions

1. How do we know loose stones on a field were brought by ice?
2. How does it come that cracks appear in soil above coal mines?
3. Why may this be considered the results of an earthquake?

C. Passing now to the northeast, reaching the woods, climb the rail fence and follow the trail to the north. After two or three minutes walk, just before emerging into more open space, a small patch of short stemmed strawberries will be found. At first sight they are unripe, being green in color; picking one, it proves to be soft; but it tastes like a ripe red strawberry. This is a rather rare plant; note, however, that it grows in quite good-sized patches.

Questions

1. Having located the north, how is east determined? West?
2. What is a compound leaf, a leaflet?
3. What are the characteristics of a strawberry?
4. Why the name strawberry?
5. Where are the seeds of the strawberry located?
6. Can you tell why this strawberry is green when ripe instead of red?

D. Continuing a little to the north, note the low bushes, the leaves of which are placed in pairs opposite each other, stems very smooth, well-groomed, the leaves are neat, prominently veined. This is the flowering dogwood. Continue through, bearing slightly to the left, and there will be found two or three acres of a dense growth of flowering dogwood, some of the trees reaching a height of fifteen or twenty feet. It is a very unusual thing to find such a pure stand of this plant. Nearly always it is found as scant specimens growing under the trees of the more open Pennsylvania forests. A study will show that once a growth of large trees was located here. The stumps can be seen. At one time, then, the dogwood was an undergrowth, the older forest having been cut out, the dogwood has now usurped the space. Here and there an oak, chestnut or poplar is poking its head above the rest. Again some day the dogwood here may become an undergrowth.

Questions

1. How do you recognize the flowering dogwood when not in bloom?
2. Why do the flower buds differ from the leaf buds in appearance and position?
3. Where do flowering dogwood trees usually grow?
4. In a patch of dogwood where there are large tree stumps what does it indicate as to the past history of that location?
5. Is the flowering dogwood attractive when not in bloom? Is the flower attractive?
6. In what way is the wood of this plant used?

The walk is well worth while just for the sake of seeing this unusual condition and especially when the plant is in full bloom in the spring and when in fruit with its red berries in the fall. Dogwood is used in the manufacture of tool handles, mallets, and other places where hard wood with fine grain is essential.

E. The return to the Normal School can be made over the same path with profit, but if time permits, one may swing around to the right to the foot of the hill following it to the normal for the return would be to pass directly through the small dogwood forest to the highway, turning to the right or to the left and bear around by one road or the other turning at each corner until the school is reached.

Let us go to the open to try to understand rather than to just see without understanding.

GENERAL SCIENCE

II. A TRIP TO THE LOCAL PAPER MILL

Previous work:

The class had been discussing the making of paper.

a. The materials—wood, rag, straw, etc.

b. The processes involving science.

It was decided to visit the local paper mill to observe the application of science in the making of paper.

Arrangements for the visit:

A committee from the class secured permission to visit the mill and arranged for the services of a guide who would explain everything connected with paper making.

Preparation:

The teacher visited the mill and studied the paper-making processes previous to the trip by the class.

The class was instructed to exercise extreme care when near moving or stationary machinery; to ask the guide reasonable questions regarding materials, machinery and processes; to give respectful attention to the guide when making explanations and to show appreciation for all courtesies and services.

At the mill:

The class was met by the guide who first of all pointed out the logs of pulp wood piled in the yard.

Guide: From what kind of tree were these logs cut?

Pupil A: They look like pine.

Pupil B: I think they are hemlock.

Guide: They are spruce.

Upon entering the mill, the first object of interest was the Chipper with its revolving knives. This machine breaks the wood-pulp into chips about one and one-half inches long.

The second process was then explained. The small chips passed from the Chipper into the Digesters. Here the chips are cooked with calcium bisulphate under steam pressure. The cooking dissolves the binding materials and leaves the pure cellulose fibre. This is called pulp.

From the Digesters the group passed to the Cleaners. As the pulp moves through the cleaning troughs, the cooking acid, undigested particles and dirt are removed.

After being thoroughly cleaned, the pulp is subjected to the bleaching action of cloride of lime. This turns the pulp to a beautiful shade of white.

The next process takes place in the Beaters where through the rotation of the Beater Roll the fibres are so frayed that they

lock together. Filler and sizing are added while the pulp is in the Beaters.

Pupil: What materials are used for filler?

Guide: Talc and china clay are used for fillers and liquid rosin for sizing. (The guide shows specimens of talc, china clay and liquid rosin for sizing.)

After the beating process, the stock is passed through Jordan Refining engines and thence to the Fourdrinier machine where the water passes off and the drying process—through drainage, evaporation and heat—takes place.

It next passes through the Calender, where the pulp in moving through a series of rolls is given the proper surface and finish. The paper is then wound into rolls and passed into the finishing room where it is cut into different sizes and prepared for shipment.

Check:

Next day the following true and false test was given. This was to form the basis of discussion for the succeeding lesson.

1. Jack pine and poplar are two of the woods used in making wood pulp.
2. Pulp is formed by adding water to wood chips.
3. All sawdust resulting from wood chipping is used as a fuel.
4. In the digesters, the impurities are dissolved by chemicals.
5. A Jordan machine makes the pulp into sheets of paper.
6. Water is drawn from paper pulp by means of suction.
7. China clay and talc are the only fillers used.
8. A mixture of rosin and sodium hydroxide is sometimes used in glazing the paper.
9. Bleaching is caused by exposing the pulp to the sun.
10. Small amounts of bark may be used in wood pulp manufacture.

SCIENCE

III. A STUDY OF BIRDS

(Junior High School)

I. Field Project — Study of Summer Birds
   Locality — Northern Pennsylvania
   Season — Summer Months

II. Committees appointed to take charge of the trip
   A. Planning committee.
   B. Committee on what to look for.
   C. Supplementary committee.
   D. Final report committee.

III. Plan
   A. A committee of pupils planned the trip. The class was organized into three groups of five students each. One group was to visit a local park; another, a nearby farm; the third, a wooded hillside.

      Each pupil was requested to bring pencil, notebook, and field glass. Directions were given each group as to what they should observe.

      At the end of a definite period of time, the leaders were expected to make a report for their respective groups. A supplementary committee was instructed to secure from books such information as could not be gathered on the trip.

   B. What to look for
      1. Kinds of birds.
      2. Characteristics
         a. color
         b. size
         c. shape of head
         d. color of legs and feet
         e. formation of wing and tail
         f. peculiarities
      3. Behavior
         a. action when discovered
         b. method of flight when seen
         c. Does it run, hop, or walk while on ground?
         d. Song
            (1). musical
            (2). unmusical
            (3). varied
      4. Nests
         a. nests containing eggs
         b. nests containing young

         c. empty nests
         d. material of which the nest is made
         e. location
      5. Importance to man.

   C. Summary of Group Reports

      The following narrative was reported from one of the groups:

      As the note of a bird was heard one of the party exclaimed, "I wonder where it is! Is it calling to its mate or is it just singing for its own enjoyment?" We listened and found the song began with a trill and ended in a call. We continued slowly and finally found the bird perched on a wild cherry tree. We observed that its color was brown, brightest on the head, and thickly dotted on the breast and sides with darker brown heart-shaped spots. The throat was light in color. The bird was about eight inches in length; tail, nearly even; bill, long and brown. With a final burst of song he flew away. "What does he eat?" "What kind of nest does he build?" "What is it made of?" and "Are there eggs in it?" These were some of the questions asked about the little songster.

      The class observed the following birds and a committee supplemented the field work from reference books in the library:

         a. sparrow
         b. gold finch
         c. thrush
         d. robin
         e. crow
         f. king fisher
         g. cat bird

      One group observed a nest in a thorn tree; another group found a nest in the crotch of an apple tree.

      General knowledge of the birds seen was gained by the individual members of the class through the oral reports of each group.

SUPPLEMENTARY TYPE LESSONS

Journeys have become a chief method by which several agencies are educating the people generally regarding things upon which they should be informed. Various industries, institutions, public buildings and museums, employ guides and encourage people to visit these.

Nature study and scientific organizations, historical and literary societies make frequent pilgrimages to places of interest in their respective fields. Chambers of Commerce are extending cordial invitations to the public to visit points of interest in the different cities in our Commonwealth.

Trees, birds, flowers, weeds and museums lend themselves so naturally to the school journey that lessons furnishing rich backgrounds have been included.

TREES

Trees offer a highly satisfactory avenue for school journeys. Parks, open spaces, highways and even the streets provide a choice variety of trees. If necessary, interesting open-air lessons can be developed around a single tree.

As a nature study subject, the tree possesses many advantages:

1. Trees are so large that a good sized class can work in an orderly manner under a teacher's guidance.
2. Trees may be studied at all seasons of the year—in winter, students may sketch the outline and bark; buds and catkins or flowers may receive attention in the spring; leaves and developing fruits offer subjects for summer study; falling leaves and seed dispersal may be the objectives in the autumn.
3. Trees present a constant change of appearance—some new devolpment evident nearly every month.
4. Fruits supply an element of interest to the children.
5. Tree study may be correlated with such subjects as literature, music, geography, art, civics and history.
6. Their economic value will serve to motivate this type of work.

In organizing tree study journeys, teachers are urged to follow the technique outline. Before proceeding, it will be well to have on hand some simple manual such as Illick's "Trees of Pennsylvania."

As a background for the organization of this work, "A Day in the Woods" by Dr. J. S. Illick, State Forester, will prove helpful. Teachers may wish to include in their journeys a study of wild flowers and weeds. The material on "Wild Flower and Weed Journeys" was prepared by Dr. E. M. Gress, State Botanist.

A DAY IN THE WOODS

"School Days in the Woods" is a profitable project. To the teacher they give opportunity to teach things as they are—nature functioning. To the children, they are red-letter days because they give a vital touch to instruction. Such school journeys make the woods or forests the laboratory; and the trees, shrubs, flowers, ferns, birds, and other wild things, the textbooks.

Aim

To get the best results, school journeys to the woods should have some special objective—a particular place to visit, a particular thing to see, a special thing to do. This does not limit the trip to one thing, but many things may be done on one journey. Some specific thing, however, should be the central theme of each journey. A trip with an objective is a purposeful trip.

What a Forest is

To study living things in their native habitats is a real delight and a worthwhile undertaking. The right way to find out what a forest really is, is to make ready and go directly to a forest and there begin a first-hand acquaintance with the big and friendly forest family. It will be a mistake to try to become acquainted with all the family members on the first visit. A good plan for the first school journey to the woods is to make a list of all the different plant and animal groups that are seen. A simple way to carry out this exercise is to make a table of two columns: one with a heading "Plants"; and the other, with a heading "Animals". The teacher should have the children list under each of the two columns the different kinds of plant groups and animal groups observed in the forest or field. Under the first column with the heading "Plants" can be recorded such names as trees, shrubs, mosses, lichens, liverwort, toad stools, etc. Under the second column "Animals" can be recorded—birds, squirrels, rabbits, insects, turtles, lizards, snakes, etc. This exercise will show that a forest is much more than a mere clump of trees. It will show that a forest is a complex community of living things.

It may also be of interest to have the pupils make notes showing how each one of these groups touches our everyday lives. How trees serve us, What shrubs give us, How ferns help us, What birds mean to us, and Why the deer is of interest to us are suggested topics for discussion. While this exercise may seem general, its importance cannot be overestimated, for it unfolds to the pupils the big world of living things as we find it in the friendly forest family.

Following this general introductory exercise it will be interesting to take up detailed studies of individual groups. For example, trees

may be selected for the subject of a school journey. The teacher may be at a loss to know just where to study trees. If you live in the city and it is not possible to go into the woods you may study the trees along the streets and in the parks. Small woodlots, fence rows, banks of streams, abandoned fields are also good places. The best place, however, is out in the wild woods.

To undertake to study all the trees in the forests of Pennsylvania is no little task, for Nature was very generous when she placed trees in Penn's Woods. By careful count it has been found that there are more than 100 native trees in Pennsylvania. A good way to begin the study of trees is to get acquainted with about 10 trees on the first school journey. Supplied with a hand-book, the teacher and pupils may go into the woods and begin to collect leaves, for the leaves are the best and easiest means by which trees can be identified. Many teachers have found it practical to place the leaves between the pages of the hand-book just opposite the description of the tree to which it corresponds. After the leaves of 10 trees have been correctly identified, the teacher can list each, and test the pupils to see that they actually know them.

After giving the most striking distinguishing characteristics of each of the trees, it is often interesting to tell something about each tree that touches our everyday life. For example, if one of the leaves happens to be that of a sugar maple, it will be interesting to tell how the sugar maple is tapped in the springtime and its sap made into maple syrup and maple sugar. If another leaf happens to be that of a sweet birch, it will be interesting to tell how the oil that is extracted from the birch is distilled and used in the flavoring of wintergreen candy and as a medicine. And if one of the trees chances to be a hemlock then it will be worth while to tell how the bark of hemlock is peeled, taken to the tannery, and there used in the tanning of leather that is made into the shoes we wear.

Later school journeys may be devoted to a further study of our tree friends. Other subjects for little tree journeys are (1) a journey to the biggest tree in the county. When there, the diameter and circumference of its trunk can be measured, the spread of its branches recorded and its height estimated. If the tree has a history it will make an interesting write-up. (2) A journey to a noteworthy forest tree plantation makes a very interesting school project. (3) A journey to an important tree place, such as a nearby botanical garden or an arboretum, or an unusual planting of trees on an estate or at a nearby home, is recommended to teachers who seek interesting subject material. (4) A visit to one of the 115 steel forest fire towers dotting the hills of Pennsylvania is always well received by the pupils. When at one of these towers subject material can be

collected for special essays and other write-ups. It will be worth while to describe the construction of the tower and to tell the purpose for which these fire towers were erected.

These are but a few of the many interesting lessons that may be learned in the woods. Each teacher will naturally be able to list other lessons and when these school journeys have once been developed they will establish themselves as a permanent part of our school work. We are just beginning to appreciate the value of the visual method of education. Long will the boys and girls remember these trips into the great outdoors, where the lessons of plant life and animal life as well as of the rocks, rivers and rills were unfolded to them in a most practical way. Recently while in Europe I saw thousands of children with their teachers along the highways, byways and waterways studying the wonders of Nature. Each trip was full of interest, full of joy, and had a purpose. Much good comes from school days in the woods. The teachers who help make school journeys a success will make commendable contribution to practical education.

A WILD FLOWER JOURNEY

In these days when the economic is so strongly emphasized and almost everything is commercialized, one hesitates to say that the general purpose of a wild flower journey is to develop in the child the love for wild flowers—to fan into a blaze that spark of love that every child has for the flowers, trees, birds and beauties of nature. The teacher must not, of course forget the utilitarian aspect of the journey, and to correlate it with the home interest of the child. In many cases the knowledge gained from the study of wild flowers can be used to stimulate the growing of flowers and vegetables in the garden. We need not, however, hesitate to admit that one of the fundamental objects and purposes in the study of wild flowers is to develop the aesthetic, the ethical and the religious feelings of the child. It is the development of these emotions that raises the civilized man above the savage and the beast; for can they not, like civilized man, secure for themselves food and shelter and take care of their physical wants. We believe that Mary Howitt had the right philosophy when she wrote the following lines about the use of flowers:

Our outward life requires them not—
  Then wherefore had they birth?
To minister delight to man
  To beautify the earth,

To comfort man—to whisper hope,
  Whene'er his faith is dim;
For who so careth for the flowers,
  Will much more care for Him!

The specific purpose of each journey will be different. Today it may be to study habits and peculiarities of six or eight blooming plants. Next week the object may be to study some of the adaptations for seed dispersal. The general purpose is rather constant but the specific purpose is constantly changing. It is the latter which must be given purposeful consideration by the teacher or leader of the journey.

Previous thought and some preparation should always precede a field trip, so that the work will not be desultory. A few hand lenses, some receptacles for bringing back materials and several garden trowels should be taken along. Every child should carry a notebook and pencil and the outstanding facts of at least a few things should be recorded. Specimens of plants that may be picked and other materials may be brought back and made the basis of further study. In this way many important points will be clinched, and others that were overlooked in the field will be brought to notice.

It is not to be supposed that the plants considered in this article are those that will be studied on the journey. Others that the teacher will have decided upon in his preparation for the journey will be substituted. But whatever flowers are observed, the field is the place to study charâcteristics, peculiar habits, habitats and relationships to other plants, animals and home interests. The details of plant and flower structures should not be attempted on the journey, but should be left for the laboratory and the school room where facilities are better.

The original plans for the journey will always be disturbed by the varied interest of the children and by the observation of plants, animals and other things that have not been anticipated. These should not be ignored and indeed it is often well to change the plans and take up the study of some plant that is unexpectedly met on the journey. Sometimes the study of an unexpected flower friend brings more pleasure and is more valuable than the study of those that were expected. However, the main purpose of the journey should not be lost sight of, and should be abandoned only when something of more interest and value may be substituted.

Scarcely have we started on the journey when right in the midst of the school ground we meet our friend, or shall I say our enemy, the dandelion. Fight the plant as we may, scarcely do we turn our back upon it when up jumps a bright yellow flower laughing, as it were, at our efforts to subdue it. Note how it has adapted itself to adverse conditions. A short stem which brings all the leaves together in the form of a rosette close to the ground where trampling feet can do it no injury. Note, also, how the flower stem bends over and holds the unopened bud close to the ground, where it too is

protected. As soon as the bud opens the stem stands erect so as to bring the bright blossom to the sight of flying insects. After the flower has been visited by the insects which will carry pollen from one flower to another, again it closes up in the form of a bud and once more the stem bends over and brings the closed-up flower down close to the ground so that no injury can befall it while the seeds are maturing. When the seeds are ready for distribution again the stem straightens up and elongates so that the seeds which form the white fluffy ball may be caught by the wind and carried here and there.

Carefully examine the dandelion flower, and note that it is made up of a number of smaller parts each of which is a perfect flower that will finally produce a seed. Dig up the plant and notice its large tap root that lives on from year to year sending up new plants even if we do cut off the older ones.

No wonder the dandelion can laugh at our efforts to chase it out of our school yard, lawns and fields and from our roadsides where we no doubt would miss its complete disappearance.

Over there along the fence notice those beautiful blue violets. Examine carefully the odd shape of the flower. Notice the bee as he lights on the flower. Try to find out how he gets the honey. Look carefully down close to the ground to see if you can find some buds They may be covered up with old dead leaves. Some of these buds never open but will produce a number of good seeds. Dig a plant up and notice the thick roots which appear to be several years old. These same roots have no doubt been producing flowers for several years. With the seed producing buds that never open and with the thick fleshy root, do you think it will do much harm to pick a bouquet of violets?

Many of our common wild flowers have myths, legends and some times historical connections.

Napoleon so loved the violet that he was called Corporal Violet. In England the violet flowers have been used to make a pudding which they called vyolette.

Most of the violets can easily be transplanted to the wild flower garden, or around the edge of a lawn where they will bloom from year to year.

Leaving the school yard we walk down into the meadow where we find large patches of the delicate little flower which is known by so many pet names as Bluets, Innocence, Quaker Bonnets, Quaker Ladies and Baby's Breath, all of which no doubt have been suggested by some of its humanlike characteristics.

May it not droop and close its petals in rainy weather and at night for the same reason that a child is peevish and restless under similar conditions; and may it not be refreshed and stimulated so

as to stand erect, open its petals and show its yellow center in sunshine by the same influence that revives the jubilant spirit of the boys and girls on a bright, sunny day? Examine closely several flowers and note that some have long stamens and a short pistil while others have short stamens and a long pistil. This is a provision which causes the insects which visit the flowers to carry the pollen from the stamens of one kind of flower to the pistil of the other kind of flowers. Do you think that a flower that is so abundant everywhere in the meadows can be picked without danger of extermination?

Dig up a few bunches leaving the earth and sod attached to the roots, take them back to the school room and place them in a pot of moist earth where they may be kept in a good condition for several days or plant them in a moist place in your flower garden where they are not disturbed and look for them again next year.

Notice over there in the deep, rich soil along the stream the fawn-spotted, lily-like leaves with here and there a beautiful yellow flower. That is the Dog's-tooth violet or more appropriately the Fawn Lily or as John Burroughs suggested the Trout Lily. Do not try to pull it up, but dig carefully down six or eight inches until you reach the thick bulbous root. It no doubt took about six years for this bulb to grow large enough to produce a plant strong enough to bear a flower. Do you think plants which grow so slowly and which bear only one flower each season should be plucked? If everyone would pull enough flowers to produce a bouquet, might there not be danger of destroying the entire patch? If you have ever taken such a bouquet of fawn lilies home, you perhaps remember how quickly they wilted and were no longer beautiful. Shall we not leave these flowers where others can see them, and enjoy them?

Over there along the edge of the woods notice an abundance of almost white flowers with pink stripes. Each plant has two long, narrow leaves. That is the Spring Beauty. Is the name appropriate? Dig carefully and see whether you cannot find a dark brown bulb. If one will carefully examine the roots of many of the earliest spring flowers, he will find that in a great many instances there is a fleshy root or bulb from which the plant grows. The food stored in this thick root or bulb was made the summer before or as in the Fawn Lily it may have taken a number of years to store up sufficient food to produce a flowering plant. Can you explain why such plants with an abundance of food stored in the root are likely to bloom very early in the spring? The bulb from which the Spring Beauty grows has a nutty flavor and is said to have been eaten by the Aborigines to ward off starvation on some occasions.

A little farther up on the wooded hillside notice the Indian

turnip or Jack-in-the-pulpit. Examine carefully the part which we call the flower. The funnel-shaped part with purplish color and green stripes, and over-hanging flap is the pulpit. The club-shaped structure on the inside is Jack.

"Jack-in-the-pulpit preaches today
Under the green trees just over the way"

Notice at the base of Jack the cluster of small flowers. Insects may be found about the flowers. These carry the pollen from one plant to another. Note where you have found Jack-in-the-pulpit, and return about August to look for clusters of red fruit where the flowers were. Pull one of the plants up and examine the turnip-like bulb from which the plant grows. Cautiously chew but don't swallow a small bit of this bulb. The substance which causes the burning sensation is poisonous. The Indians found that by boiling the bulb the burning and stinging material was destroyed and that the bulb could then be eaten. It is, therefore, not hard to guess how the plant received the name of Indian turnip.

A list of other flowering plants seen on the journey, but not given such detailed study should be made. Date of blooming time, locality, soil conditions and other data may be listed.

A WEED JOURNEY

The purpose of a weed journey is to become familiar with some of the noxious weeds, to observe the characteristics and habits which cause some plants to be classified as weeds, and to study and formulate general methods of destruction and eradication.

A weed is often defined as a plant out of place. This may be true but the definition is not adequate. A little observation and study will soon reveal to us that a weed is a plant not only growing where we do not want it to grow but that has become adapted to conditions which may be very unfavorable to the growth of cultivated plants. Under extremes of drought or moisture, heat or cold, sunshine or shade, poor soil or fertile soil the weed continues to thrive while the crop plant may suffer and even die.

In many instances it will be noticed that weeds have acquired some very effective methods of reproduction. Some may produce an abundance of seeds, others may produce runners, or stolons or bulbs or creeping root-stocks, or some character which will not only insure their reproduction but which will make them difficult to eradicate.

In preparing for the trip a strong trowel or digger of some kind should not be overlooked. A hand lens may be used with pleasure and profit. Each pupil should be provided with a notebook and pencil and some receptacle, if only a newspaper, to bring back

seeds, portions of plants with flowers and leaves and other interesting material that may be made the basis of further study.

A vacant lot, a dump heap, a fence row, an old field or even a cultivated field or garden will furnish an abundance of material. Late spring and early fall is perhaps the best time in the school year to make a weed journey.

As we walk through the vacant lot, notice the beggar's ticks sticking to our clothing. The plant from which they come has many different names such as Spanish needles, Devil's bootjack, stick-tights, and pitch-forks. All of these have no doubt been derived from the character of the seed which we find in our clothing.

Examine the plants from which these seeds come. Count the seeds in one head and the number of heads on an average size plant. Does each plant produce few or many seeds? Drop some of the seeds into water. Do they float or sink? Weed seeds are scattered by different agencies such as wind, water, birds and other animals including man. How are the Spanish needles distributed? Is there sufficient reason why the plant should be found everywhere throughout the United States?

Dig up a plant and examine the roots. Are they large and fleshy or bulbous or do they have a rather small ordinary root for a plant of such size? Will such a root likely live over winter and produce another plant next year? A root that lives only one season is called annual. In order to destroy annual plants is it necessary to pull or dig the plant out of the soil? The seed being the only part of the plant that lives through the winter, what precaution must be taken in order to eradicate the plant?

Notice under what conditions the plant seems to thrive best, in shade or sunshine, in dry or wet and poorly drained places. Sometimes weeds can be eradicated by changing soil conditions. Is there any indication that this weed would yield to such treatment?

Notice the plant with that flat cluster of white flowers and filmy, fern-like leaves. It is commonly called wild carrot, Queen Anne's lace or bird's nest. Examine the flower cluster and note how a number of individual flowers form small clusters which together form one large cluster. Each small cluster is an umbellet, while the large cluster is called an umbel. Examine an old cluster and notice that each small flower in the umbellet forms a ribbed seed. Count the seeds in an umbellet, and the umbellets in one umbel also the number of umbels on an average size plant. Estimate the number of seeds that one plant will produce. Notice the oldest umbels which have begun to scatter seeds. Is it still flat or has it become cup shaped? Can you see any reason why the plant might be called bird's nest? Will this cup shaped cluster drop its seeds

as quickly as if it had remained flat? As the wind shakes the plant which kind of cluster would insure a more gradual and probably a wider distribution of seeds?

Examine the stem of the plant. Is it solid or hollow? If the same amount of material were in the form of a solid stem which would be the stronger the hollow stem or the solid stem? This dead stem usually stands erect throughout the winter holding its nest-shaped cluster with some of the seeds still in it. What would happen if some of these seeds drop out on the hard crust of snow when the wind is blowing? Is there a reason why the wild carrot should be so widely distributed?

Notice the filmy fern-like leaves also the fine network formed by the small white flowers. Is Queen Anne's Lace an appropriate name for the plant?

Dig up the roots. Are they small and thread-like or is there a large root from which the smaller roots branch? What garden vegetable has a similar but somewhat more fleshy root? Is there any reason why the plant is called wild carrot? Look over the ground for clusters of leaves called rosettes which apparently have not produced a stem with flower clusters. Dig some of these up and examine the roots. Notice that the roots are quite large and have a good deal of food stored in them. The rosette of leaves has been making food all summer and storing it up in the root. The root will live over winter like our garden carrot. The following season a new plant will grow from this root and produce flowers and seeds after which the whole plant except the seeds dies. Such a plant whose roots live for two years is called a biennial. Is a biennial harder to eradicate than an annual? Suggest a method of eradication for annuals and biennials.

Notice the weed with the twining stem and flowers like the morning glory. It is called Bindweed. Is the name appropriate? Examine some of the older flowers or the seed vessels called capsules to find out if possible how many seeds each flower will produce. Count the flowers, buds, and capsules on one vine. Will each plant form many or few seeds as compared with the beggar's ticks and wild carrot?

Dig carefully and follow out the roots. Does it have a root like the beggar's tick or the wild carrot? The thick cord-like roots have a considerable amount of food stored in them. Where was this food manufactured? If these roots live over winter will they likely produce one or more than one new plant? If some of the seeds and the roots also produce new plants next year, will the bindweed likely be crowded out by other plants or is it more likely to crowd out and smother other plants? If the farmer plows, harrows and culti-

vates through a patch of bindweed is he not likely to drag the cord-like roots to other parts of the field where they may grow and start new plants?

Roots like those of the bindweed that live from year to year are called perennial. Both roots and seeds must be given attention if one wishes to eradicate such a plant. Will it be more or less difficult to completely destroy the bindweed than to destroy the beggar's tick or wild carrot? If all the food stored in the perennial roots is manufactured by the green leaves of the plant, what must be done in order to starve out such roots? Can all the roots likely be starved and destroyed in a single season? Suggest some method of attack which if persistently followed, will finally eradicate such a pest as the bindweed.

All weeds can be classified as annuals, biennials, or perennials. Make a list of each. Head the annual list with beggar's tick, the biennial with wild carrot and the perennial with bindweed. Increase the three lists by adding as many other weeds as possible. Books and bulletins may be consulted to determine to which class some weeds belong, as it is often difficult and even impossible to decide from first observations. All weeds in one class may be eradicated by the same general method of attack. Indeed the same method may be used with both annuals and biennials. Suggest methods of eradication for each of the three classes.

BIRDS

In proportion as the esthetic and economic values have become known, there has developed an increasing interest in birds. The organization of a bird study program will depend upon the season of the year. Since certain birds remain in Pennsylvania throughout the year, those may be studied at any time. While the spring arrival and the fall migration are profitable periods, the most interesting time will be during the nesting season when children may observe the materials with which our feathered friends make their nests, the types of food they consume, how they rear their families and train the fledglings for their life's work.

The following "Introduction to a Study of Birds" by State Ornithologist, Dr. George M. Sutton, contains material from which interesting bird journeys may be developed:

INTRODUCTION TO A STUDY OF BIRDS

On a short walk through suitable country, children may learn a great deal about birds if they observe carefully, take notes accurately, and form and retain correct impressions.

Our spring birds are so numerous that if the walk includes an old orchard, a brushy stream-side, and an up-grown field, there should be no difficulty in finding a dozen or more species. To locate birds one must not only look about him continuously but one must train his ear to catch slight sounds. Faint chips often lead to the discovery of interesting birds.

As the children walk along a brushy roadside a Song Sparrow flies from bush to bush, its tail pumping noticeably. The Song Sparrow is the only common member of its tribe which thus pumps its tail. Some of the children will not see this Sparrow as it runs along the ground. This fact should furnish good reason for remarks on protective coloring. The general color-tone and streaking of the Song Sparrow make it difficult to see when it is near the ground.

If the Song Sparrow is watched for a few minutes, it will likely mount a high twig and sing brilliantly. If the children attempt to write or imitate the song they will find that there are nearly always two or three sharp accented notes at, or near, the beginning of the song. By comparing this song with other bird notes which may be heard at hand they will see that this is the only song which has three such accented notes.

If they can see the Sparrow plainly enough they will notice that it has a short, conical bill which is adapted to cracking hard seeds.

Three crows fly over cawing loudly. Fortunately the Crow is very easy to recognize partly because it is entirely black, and partly be-

cause the well-known call note is so easily imitated by a human being. The Crow, obviously even to children, is not a protectively colored bird. The Crow, realizing this, comes to the ground only in large open fields, or perches at the top of trees. It will not be found in the brush where Song Sparrows can live so safely. Perhaps the children will notice that the Crow flaps easily and swiftly, usually in a direct line. This method of flight is responsible for the phrase "as the crow flies." By comparing the flights of different birds the children will soon see that the wing beats of the Crow are more regular than those of most birds.

On a fence-post perches a Bluebird. To the child who is baffled by the large number of spring birds it will be encouraging to learn that there are only three common blue birds in eastern North America—the Bluebird, the Blue Jay, and the Indigo Bunting. The Bluebird is always a bird of the more or less open country. The Blue Jay is a larger species of the woodlands; and the Indigo Bunting, smallest of the three, will nearly always be found in the vicinity of blackberry or raspberry tangles.

As the children walk through the old orchard they may examine the trees for old nests, and for woodpecker holes which have been drilled into the trunks. Perhaps someone will locate an apple tree which has been perforated by sapsuckers in making their sap-wells. It will be noticed that these wells, which are placed in the bark in regular rows, sometimes completely encircle the trunk. These wells not only hold the sap which the sapsucker drinks, but also lure insects which are in turn eaten by the bird. The sapsucker is the only woodpecker which has this habit.

Nearby may be seen a male Downy Woodpecker, a black and white spotted bird about the size of an English Sparrow, with a tiny red patch at the back of its head. The female lacks the red patch, because she is more protectively colored. If the children have never seen a woodpecker they will be surprised that it goes up the side of the trunk using its tail as a brace. The ten tail feathers are stiff and pointed. The woodpecker's feet are provided with strong, sharply curved claws and the toes are placed two in front and two behind so as to make clinging to the bark easier. The woodpecker's bill is sharp as a chisel and is used for chipping off the bark in procuring food. The woodpecker's coloring is protective, too, since the white markings across the dark plumage tend to destroy the bird's shape when it is seen against the sky. An old nesting cavity of the Downy Woodpecker may be found by one of the children. If the cavity is torn open it will be seen that the inside has been neatly chiseled out and that a loose pile of tiny chips has been left in the bottom as a soft padding for the eggs.

In an open field many blackbirds walk about. These big, shiny creatures should be called Grackles. If a Robin is near at hand the children will see that the Robin runs across the grass while the Grackles walk sedately. Comparatively few kinds of birds walk; some, such as the English Sparrow, hop, two feet at a time; some, like the Robin take short runs. If by slipping up carefully the children can see a Grackle close at hand they will be amazed at the brilliant iridescent colors—bottle green, peacock blue and bronze. Though these birds look black at a distance there is really not a black feather upon them. The lustrous color is due not to pigment in the plumage but to the tiny particles of the feathers which reflect the light-rays like minature mirrors. Perhaps the brilliant pale yellow eye of the Grackle will be seen; and surely when the bird flies away the strange boat-shaped tail will be noticed. This type of tail, with the outer edges turned up and the central tail feathers much depressed, occurs only in this group of birds in America.

The children will learn after trying to approach a bird closely that it can see very keenly. In watching the Robin they will see the bird turn its head as it listens intently for the scraping of a worm in its tunnel. Thus the children learn that the sense of hearing, too, among birds is very acute.

If a bird flies away they will be able to see how the tail is used as a rudder and how the wings push the bird forward through the air.

The songs of birds, the color of their plumage, their grace of flight, interesting ways and economic value are all sources of worthwhile study and delight. So many things may be learned from experience with one bird, especially when it is close at hand, that it is honestly difficult to confine one's self to any one line of thought while on a bird trip.

The study of birds should furnish abundant incentive for close observation and accurate note-taking, and should be easy to conduct, for most children instinctively enjoy study of this sort.

A LESSON IN A MUSEUM

The Philadelphia Commercial Museum is rendering the schools a valuable service through the cabinet collections it gives, and the lanterns, lanternslides, film material, etc., which it loans to schools.

But the Museum has a rich collection on geography, commerce and industry—one of the richest in the world—which it cannot loan but with which it is important that children should come into contact.

The Museum has provided a staff of instructors to meet and teach visiting classes, using the wealth of material it has collected.

The following by Curator C. R. Toothaker is typical of geography and other lessons given in the Commercial Museum:

(It will be noted that this lesson is a fine example of a combination of visual aids, the teachers using—school journey, object—specimen—model, pictorial material, demonstrations and experimentation.)

Previous to this visit (a class from the Philadelphia public schools) a preparation sheet was sent to the teacher. In this way, the work of the Museum was correlated with that of the classroom.

THE RUBBER INDUSTRY

I. Aims

1. To visualize—by means of models-objects-specimens, motion pictures, lantern slides, demonstrations and experiments—the gathering of rubber milk (latex) and the making of crude rubber (biscuits) in the Amazon Valley and the "Far East".
2. To discover reasons why the "Far East" is supplanting Brazil as the foremost rubber region.
3. To show the rapid growth of rubber manufacturing in the United States during recent years, and the necessity of an ever increasing supply of raw material to fill our demands.
4. To show by experiments the best modern process of making rubber from the latex.

II. Method

The pupils, upon arriving at the Museum, were taken to a group of seats arranged in front of a lifesize model representing a section of the Amazon jungle. In the model, a number of native trees, among them several Para rubber trees, and a tangle of vines and undergrowth characteristic of the jungle, are reproduced.

Using a physical map of the world, the type of climatic and topographic conditions necessary to produce such a growth is briefly discussed.

Pupil Activity

The pupils observed closely the wild rubber trees, noting their scattered growth and the difficulty of working in the jungle because of the dense vegetation. At one end of the case the children see the life-size figure of a Brazilian Indian collecting latex from the little cups on the trunk of the rubber tree. Methods of tapping trees, gathering the latex, and drying the rubber were next noted, through a study of the models in the case. At the opposite end, under a rude shelter of palm leaves another Indian is drying the rubber over a fire of palm nuts upon a wooden paddle.

The teacher then shows a jar of real rubber milk to the children; a part of the contents is poured on a board and allowed to dry.

Brazil's Contribution

Fine Para—for some purposes the best rubber in the world—comes from Brazil. The character of the workers and the relatively small number for such a vast area were considered. Frequently this rubber is not carefully prepared. For many years, Brazil was the foremost rubber-producing country in the world. Children looked at the label attached to the case which reads "Brazil no longer leads the world in the production of rubber" and then learned that at the present time almost all of our rubber comes from the "Far East"—Ceylon, Malay Peninsula and the British East Indies.

The Far East Plantations

Children discovered as reasons for their success the following:

1. Suitable climate.
2. Foreign capital, careful supervision of the modern methods of growing, care in gathering and making rubber.
3. Unlimited number of willing workers from nearby densely populated lands (Chinese and Malay).

EXPERIMENTS

Children through experimentation made rubber by the process used in the Far East, which is different from that used in Brazil. Teacher poured some lemon juice into a glass of cow's milk. Children noted what took place.

Just as acid (lemon juice) added to cow's milk causes curds to form, so acetic acid added to rubber milk (latex) will cause little particles of rubber to join together and separate from the watery part of the latex.

Experiment was conducted by the children with the teacher as guide by placing some latex in a glass jar and slowly adding the acetic acid, stirring constantly. They discovered that a lump of rubber formed which was lifted out and placed on a stone slab. One pupil, with a heavy roller, pressed the water out of the lump of rubber.

At this time, the process of making a sheet of rubber-crepe by use of heavy machine-driven rolls was explained.

Another pupil now examined the latex that was poured on the board at the beginning of the lesson. He discovered the rubber that formed as the moisture evaporated from the latex and showed this to the class. In some regions, rubber is obtained in this way. The latex is poured on a leaf and left to dry. The pupils examined a sheet of rubber obtained by this method.

Characteristics of Rubber

As some pupils examined specimens of rubber, the qualities of rubber were considered—its elasticity, condition of hardness or softness, its characteristic of being waterproof, its use as insulation for electric appliances, etc. From this discussion, developed the fact that the process of manufacturing depends on how the article is to be used. The use of cotton in the rubber industry was then discussed.

Individual Activity

Many specimens illustrating the facts discussed in the lesson had been placed on three tables. The class was then divided into five groups: three were assigned to the tables; one, to the case showing the jungle; and the other, to a case of rubber products. The pupils studied the exhibits and labels and made note in their memorandum books of all important facts gathered. At the end of a given time, the groups moved; this was continued until each child had visited all the tables and cases.

Class Activity

The class was then taken to the lecture room where motion pictures and slides were shown illustrating important points of the lesson. Following this, the pupils studied the life-size model of a native tapping a rubber tree on one of the plantations in the "Far East".

As a conclusion to the lesson, a sheet containing recent and important information concerning rubber, a suggested reading list, and a piece of plantation rubber from the "Far East" was given to each child.

The teacher was given a follow-up sheet to be used in school in correlating the museum lesson with the regular work.

APPENDICES

1. Sources of Free Slides and Films
2. Requirements for Showing Motion Pictures in Schools

1. SOME SOURCES OF FREE FILMS AND SLIDES

Schools equipped with still and motion picture, glass slide or film strip projectors may secure valuable material from the following agencies, through the payment of the transportation cost:

Pennsylvania State Library and Museum, Harrisburg
Slides covering practically all subjects

Commercial Museum, Philadelphia
Slides and films on geography, commerce, transportation

Department of Agriculture, Harrisburg
Material covering the field of agriculture

The Department of Forests and Waters, Harrisburg
Material covering forests and conservation

State Game Commission, Harrisburg
Fish and game material

Department of Health, Harrisburg
Slides and films on health

Department of Labor and Industry, Harrisburg
Safety material

Department of Welfare, Harrisburg
Welfare material

Department of Highways
Material on highway construction

International Correspondence Schools, Scranton
A film, "The University of the Night"

American Optical Company, Southbridge, Massachusetts
A film, "Through Life's Windows"

Bell Telephone Company of Pennsylvania (apply to nearest office)
A film, "The Electrical Transmission of Speech"
A film, "The Silent Speaker"

The General Electric Company, (Publicity Dept.), Schenectady, N. Y.
Slides and films covering different phases of electricity, navigation, manufacture, forestry, wireless, etc.

State Board of Censors, Joseph A. Berrier, Secretary, Harrisburg
Sixty reels visualizing the different activities of the State government

Long-Bell Lumber Company, Kansas City, Missouri
Lumber and Its Uses (Several films)

Ray-Bell Films, Inc., 817-23 University Avenue, St. Paul, Minn.
Films on Civics, Geography, Health, Industry, Science

National American Red Cross, Washington, D. C.
Red Cross Activities "The Twister"

Pennsylvania Motor Federation, Front and Market Streets, Harrisburg
Films on Pennsylvania's Historic Shrines, Scenic Spots, Highways, Transportation, etc.

Bureau of Commercial Economics, 1108 Sixteenth Street, Washington, D. C.
Films covering the social and intellectual life of all nations

International Harvester Company, 606 South Michigan Avenue. Chicago
Sides and films covering different phases of agriculture, home economics, canning, dairying, poultry raising, etc.

The New York Times, Times Square, N. Y.
Film, "Making a Great Newspaper"

Ginn and Company, Boston, Massachusetts
"Making a Book"

Doubleday, Page and Company, Garden City, N. Y.
"Making Books and Magazines"

United States Department of Agriculture, Washington, D. C.
Agricultural Material

United States Public Health Service, Washington, D. C.
Health Material

United States Department of Mines, Pittsburgh
Mineral, Industrial, Americanization Material

United States Steel Corp., Safety Bureau, Washington, D. C.
Industrial and Welfare Material

United States Department of Labor and Industry, Washington. D. C.
Safety Material

Metropolitan Life Insurance Company, New York City
Film, "New Ways for Old"

Western Electric Company, 120 West 41st Street, New York City
Films visualizing the telephone and the telegraph

Westinghouse Electric and Manufacturing Company, Pittsburgh
Lecture and film service dealing with electricity and its application

E. I. DuPont de Nemours and Company, Inc., Wilmington, Delaware
Science and Building Films

Spencer Lens Company, 33 West 42nd Street, New York City
Film Strip, "The Story of Hawaii"

Keuffel and Esser Company, Hoboken, New Jersey
Slides, film and written lecture on—"The Use of the Slide Rule in Trigonometry"

2. REQUIREMENTS FOR SHOWING MOTION PICTURES IN SCHOOLS

Projectionists (Operators)

Operators of motion picture projectors must receive a license from the Department of Labor and Industry before doing any operating work. The license will be granted upon the passing of a simple examination which is given to insure that the projectionist can operate the projector in a proper manner and that he understands what to do in case a fire occurs. Examinations are held in various parts of the State at irregular intervals and there is no undue delay in issuing licenses. Persons desiring to operate projectors of the approved or non-theatrical type must be at least sixteen years of age. Those desiring to operate projectors of the commercial or theatrical type (Powers, Simplex, Motiograph) must be at least eighteen years of age.

Commercial Projectors

Commercial or stationary projectors are the type used in theatres. These types of projectors must be used in a fire proof projection room (booth). This applies to classrooms as well as auditoriums. There must be at least two points of egress from every classroom in which it is desired to use stationary projectors, and in auditoriums the proper number of exits for the seating capacity as laid down by the regulations of the Department of Labor and Industry must be provided.

Portable Projectors

Portable projectors, or suitcase models as they are sometimes known, must be approved by the Department of Labor and Industry. This is to insure that they are constructed in such a manner that film fires will be snuffed out or that any flame, should a fire occur, will be retained within the projector. The portable and semi-portable projectors which have received approval to date are the:

Portable
- Acme
- Cello
- DeVry
- Kodascope
- Pathescope
- Victor Cinema

Semi-portable
- Graphoscope Jr.
- Holmes
- Zenith

Non-flammable film is the type which is generally used in portable projectors. If this type is used, a booth is not required and the projector may be used either in classrooms or auditoriums. If flammable films are used a booth must be provided regardless of where the projector is used.

Booths

When it is contemplated placing permanent booths in classrooms or auditoriums, the complete specifications for the construction of the booth should be obtained from the Department of Labor and Industry. In order that school authorities who are contemplating erecting booths, may have some idea as to the size and the principal features of the booth the following information is given:

All permanent booths or enclosures shall be at least seven (7) feet high, and the floor space for one commercial projector shall be at least six feet by eight feet. For approved portable or semi-portable projector the dimensions may be seven feet, by four feet by six feet. The framework of the booth shall be of steel angle irons. The spaces between the framework shall be filled in with asbestos boards. The above specifications, however, do not prevent the booth being constructed of more permanent material such as b ick, tile or concrete.

An air inlet shall be provided in each side of the booth about three inches above the floor and a vent pipe shall be placed in the center of the top of the booth. This pipe shall lead directly to the outside of the building or to a special incombustible flue. Connected to the vent pipe in a manner provided by the regulations of the Department, there shall be a motor driven blower with a capacity of fifty cubic feet of air per minute. This is for the purpose of exhausting from the booth the smoke and flame of a fire, should one occur.

These few points are mentioned in order to point out the importance which the Department attaches to the use of flammable films and to impress upon the user the necessity of securing complete information and the cooperation of the Department of Labor and Industry before proceeding to show motion pictures in school buildings.

Auditoriums

Auditoriums are to be provided with a prescribed number of exits in accordance with the seating capacity. All auditoriums in which motion pictures are to be shown, must first be approved for this purpose. To secure approval, plans or sketches showing the exits, seating arrangements, location and intensity of emergency lights must be filed with the Department of Labor and Industry.

End of Title